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METAMODELING TECHNIQUES AND APPLICATIONS

Mission Research Corporation

Dr. Don Caughlin

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13. ABSTRACT (Maximum 200 words)

Tactical simulation models used by the Department of Defense to assess the capabilities of combat systems and tactics are highly complex. It is often difficult to determine the relationship of individual factors to the performance of the modeled process. A technique called metamodeling has the ability to address this problem. This research developed the capability to build dynamic metamodels of tactical engagement simulations.

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TABLE OF CONTENTS

VOLUME II Research Summaries

LIST OF FIGURES

VOLUME II

LIST OF TABLES

VOLUME II

CHAPTER 1

ANALYSIS OF TERSM MODEL 7

1. INTRODUCTION

In this experiment we look for sources of ill conditioning among regression variables in the TERSM least squares model from [1]. This metamodel was generated by a least squares fit of selected input data and provided an estimate of the number of emitters found with a CEP of 5 nautical miles (nm) or less. The inputs were aircraft altitude and velocity, azimuth coverage and channel capacity of the sensor. These inputs were combined to generate a nonlinear system with 22 inputs (up to the fourth order of a single input) to produce the square root of the number of emitters with a CEP of 5nm or less. Using a 2 layer central composite experimental design, the following model was obtained:

$$\begin{aligned}\sqrt{y} = \; & 23.567 - 0.669x_1 - 2.842x_2 + 1.298x_3 + 3.344x_4 \\ & -0.491x_1x_3 + 0.963x_1x_4 + 0.414x_2x_3 + 1.155x_2x_4 \\ & +0.231x_3x_4 + 0.404x_1x_2x_3 + 0.198x_1x_2x_4 + 0.201x_1x_3x_4 \\ & -0.285x_2x_3x_4 + 2.037x_1^2 - 0.788x_3^2 - 2.743x_4^2 + 0.714x_1^3 \\ & +5.836x_2^3 + 0.744x_3^3 - 2.947x_1^4 - 5.823x_2^4\end{aligned}$$

where:

x_1 = Altitude

x_2 = Velocity

x_3 = Azimuth

x_4 = Channel Capacity

The model provided an excellent fit with an R^2 of 98.9%, maximum absolute error of 73.51 emitters, and an average absolute relative error of 4.7%. This is a good example of a metamodel that can be used to explore the effect of the different input variables on the output via surface response methodology or capability based analysis.

The purpose of this analysis is to assess the extent that the least-squares estimate $\theta = (X^TX)^{-1}X^Ty$ is potentially harmed by collinear relations. The harm from collinearity comes from the fact that a collinear relation can result in a situation where the observed influence of the explanatory variables is overcome by the model's random error term reducing the signal to noise. Collinearity is ill conditioning and is a data problem. Variates are collinear if the data vectors lie is a subspace of dimension less than the number of variates. This is equivalent to saying that there is a high correlation between the variates. Consequently, collinearity will be defined in terms of the conditioning of the data matrix X. This analysis is outlined in Volume I, Chapter 9, Section 3.3 and follows the development in [2].

1.1. Objectives of the Analysis

The analysis of the data set will attempt to answer the following questions:

1. How many near dependencies plague a given data set.
2. Which variates have coefficient estimates adversely affected by the presence of the dependencies.
3. Whether estimates of interest are included among those with inflated confidence intervals; and, therefore, corrective action is warranted.
4. Whether prediction intervals based on the estimated model are greatly inflated by the presence of ill conditioned data.
5. Whether specific coefficient estimates of interest are relatively isolated from the ill effects of collinearity; and, therefore, trustworthy in spite of ill conditioned data.

The analysis was accomplished via the aid of computer aided routines and some of the output is used in this chapter.

2. INPUT DATA ANALYSIS

If the data contain a constant term - the explanatory variable matrix X should contain uncentered data along with a column of ones. The use of centered data should be avoided since centering can mask the role of the constant in any underlying near dependencies and produce misleading diagnostic results.

Define μ_k, $k = 1,\ldots,p$ as the singular values and v_{kj} as the variance of the matrix X. Compute the Singular Value Decomposition (SVD) of X:

a. Calculate the condition indexes from $\eta_k = \frac{\mu_{max}}{\mu_k}$, $k = 1,\ldots,p$

b. Calculate the Π matrix of variance-decomposition proportions from

$$\pi_{jk} \equiv \frac{\frac{v_{kj}^2}{\mu_j^2}}{\sum_{j=1}^{p} \frac{v_{kj}^2}{\mu_j^2}}$$

Figure 1.2.1 is a plot of the variance decomposition matrix.

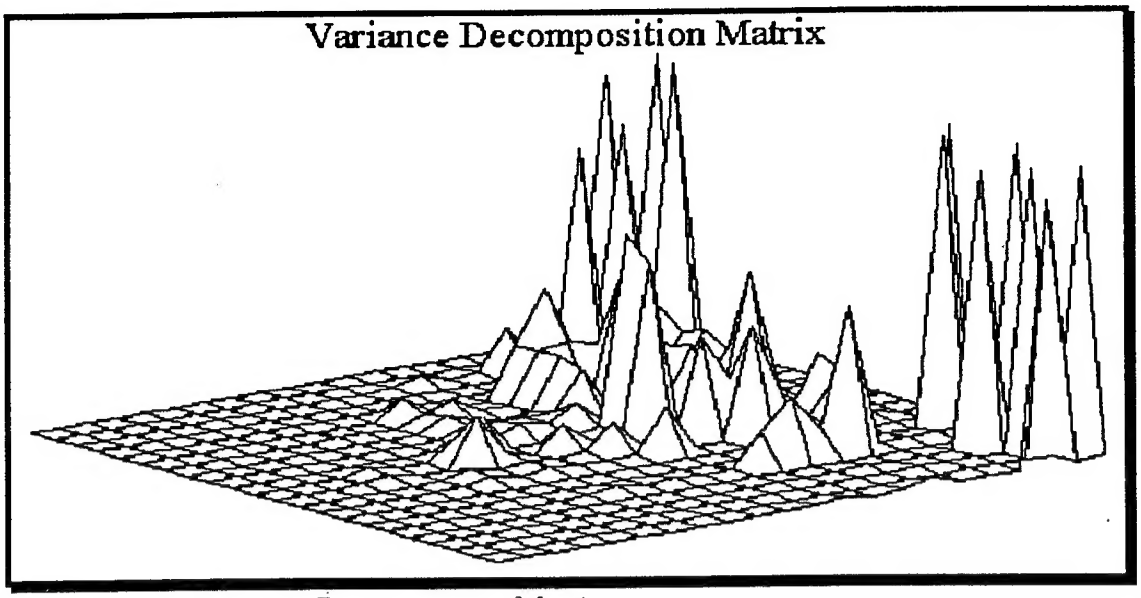

Figure 1.2.1. Variance Decomposition Matrix.

First, we determine the number and relative strengths of the near dependencies by the condition indices exceeding a given threshold. Examine the condition indices for the presence of competing dependencies - roughly equal condition indices. Then, we examine the condition indices for the presence of dominating dependencies - high condition indices coexisting with even larger indexes.

There are 16 indices exceeding a threshold of 10, they are:

1.0e+003x						
0.0106	0.0128	0.0142	0.0224	0.0257	0.0328	0.0391
0.0502	0.0667	0.0792	0.1192	0.1461	0.1559	0.1955
1.5048	1.9295					

There are 13 indices exceeding a threshold of 20

1.0e+003x						
0.0224	0.0257	0.0328	0.0391	0.0502	0.0667	0.0792
0.1192	0.1461	0.1559	0.1955	1.5048	1.9295	

There are 11 indices exceeding a threshold of 30

1.0e+003x						
0.0328	0.0391	0.0502	0.0667	0.0792	0.1192	0.1461
0.1559	0.1955	1.5048	1.9295			

The next step is to determine the number and relative strengths of the near dependencies by the condition indices exceeding a given threshold. The condition indices are:

1.0e+003x

0.0010	0.0027	0.0032	0.0040	0.0062	0.0078	0.0106
0.0128	0.0142	0.0224	0.0257	0.0328	0.0391	0.0502
0.0667	0.0792	0.1192	0.1461	0.1559	0.1955	1.5048
1.9295						

Figure 1.2.2 is a plot of the condition indices, Table 1.2.1 summarizes the results of the analysis of the condition indices.

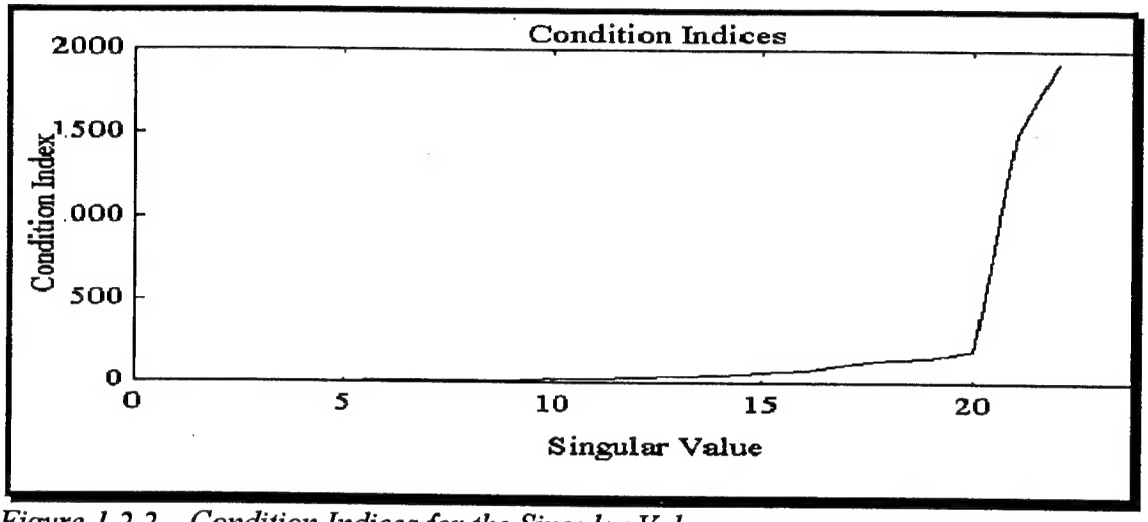

Figure 1.2.2. Condition Indices for the Singular Values.

Table 1.2.1. Results of the Analysis of the Condition Indices.

Competing Dependencies Between the Lower and Upper Condition Numbers	Lower Condition Number	Upper Condition Number
2	15	30
3	30	60
3	60	120
3	120	240
0	240	480
0	480	960
3	960	1920
3	1920	3840

The condition number 1929.46 is a dominating dependency. The variance proportion of condition number 1929.46 is shown in Figure 1.2.3. There is one variance proportion above 0.5. Auxiliary regressions are warranted with the dependent variable 20.

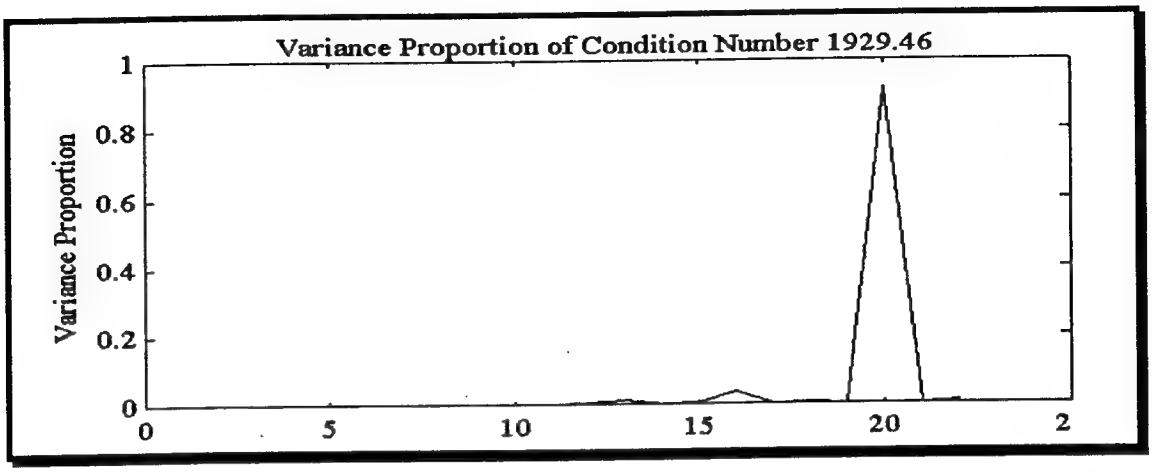

Figure 1.2.3. Variance Proportion of Condition Number 1929.46.

The condition number 1504.83 is a dominating dependency with one variance proportion above 0.5. Auxiliary regressions are warranted with dependent variable 22. The variance proportion of condition number 1504.83 is shown in Figure 1.2.4.

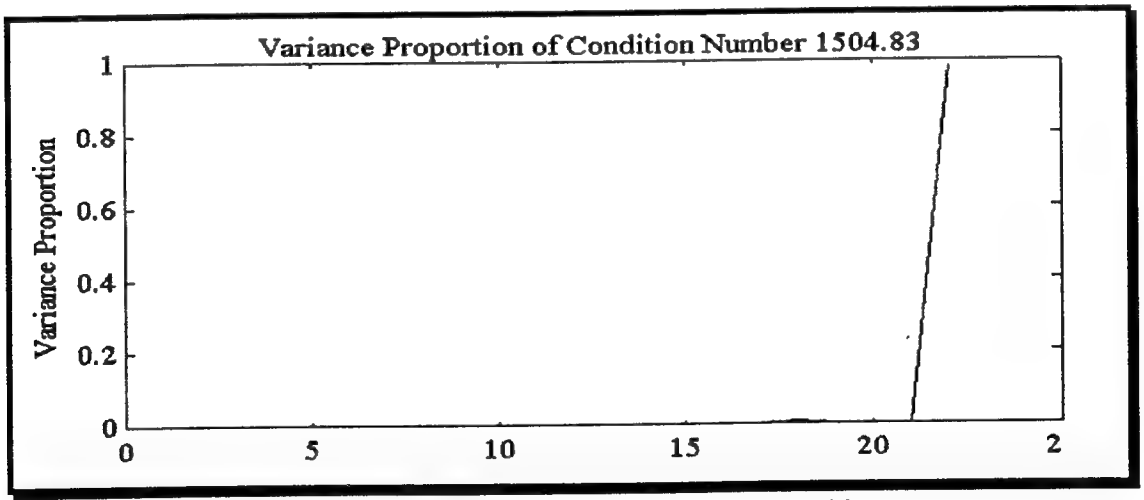

Figure 1.2.4. Variance Proportion of Condition Number 1504.83.

Condition numbers 146.069 through 195.468 are competing dependencies with three variance proportions above 0.5. Auxiliary regressions are warranted with the following dependent variables: 21, 20, 22. The variance proportion of condition numbers 146.069 through 195.468 are shown in Figure 1.2.5.

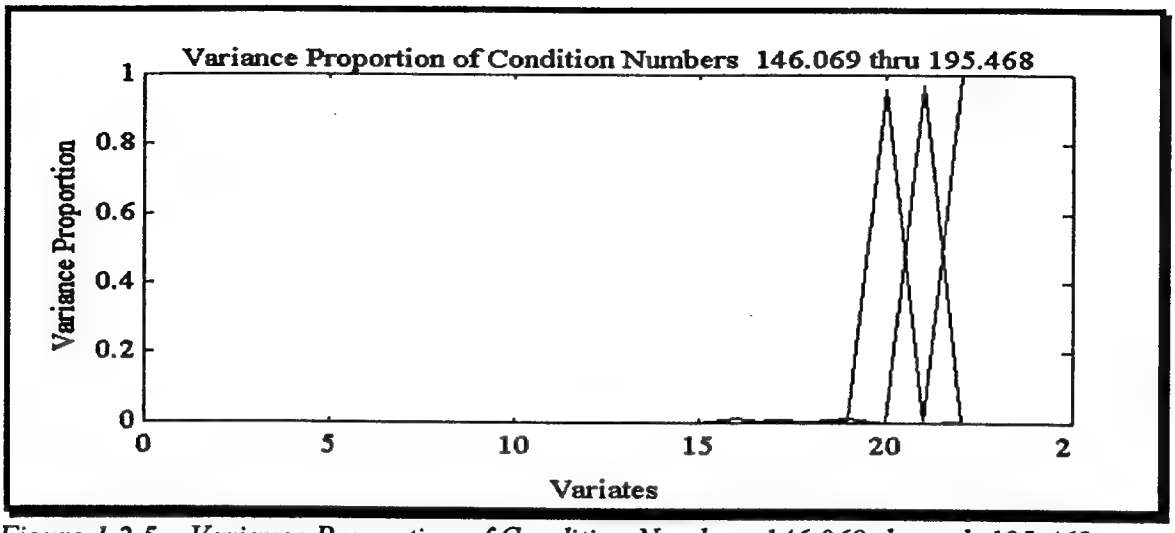

Figure 1.2.5. Variance Proportion of Condition Numbers 146.069 through 195.468.

Condition numbers 66.6565 through 119.17 are competing dependencies with two variance proportions above 0.5. Auxiliary regressions are warranted with dependent variables 21 and 22. The variance proportion of condition numbers 66.6565 through 119.17 are shown in Figure 1.2.6.

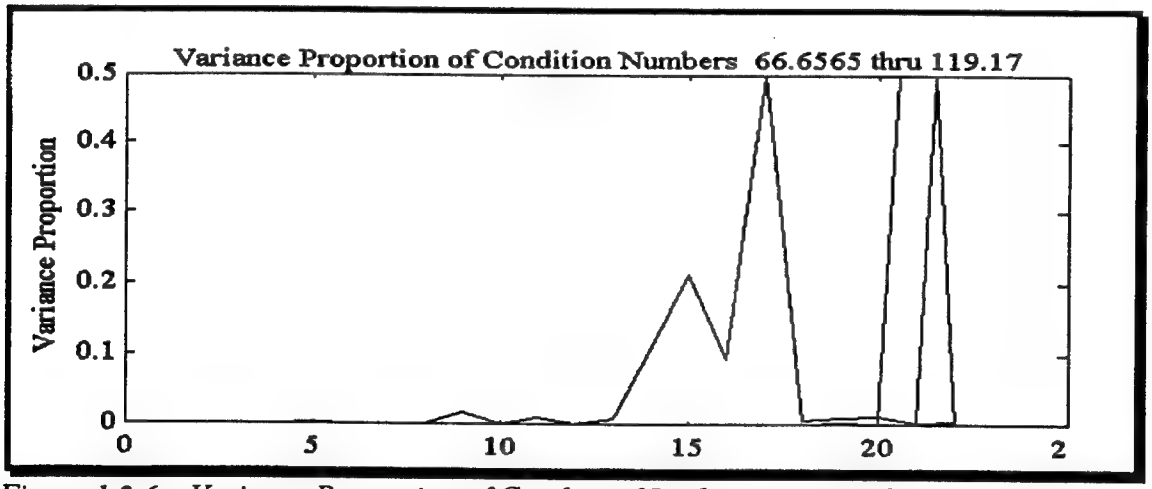

Figure 1.2.6. Variance Proportion of Condition Numbers 66.6565 through 119.17.

Condition numbers 32.8435 through 50.197 are competing dependencies with one variance proportion above 0.5. Auxiliary regressions are not required for these indices.

Condition numbers 22.3729 through 25.6774 are competing dependencies with one variance proportion above 0.5. Auxiliary regressions are not required for these indices.

Table 1.2.2 summarizes the results of the analysis of the pi matrix and depicts variates that have single dominant or a set of competing condition numbers. The first rows are from the higher condition numbers.

Table 1.2.2. Results of the Analysis of the pi Matrix.

20	0	0
22	0	0
21	20	22
21	22	0

The following is from auxiliary regressions using dependent variables 22, 21, and 20.

Dependent Variable # 20

R Squared = 1

Regression Coefficient	t Statistic	Probability of error in accepting H0 (no correlation)
0.6727	12.5361	1.0000
0.0000	0.0000	0
0.0000	0.0000	0
-2.2659	20.2849	1.0000
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
2.5933	44.9084	1.0000
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0

Dependent Variable # 21

R Squared = 1

Regression Coefficient	t Statistic	Probability of error in accepting H0 (no correlation)
-0.1142	2.5924	0.9854
0.9922	16.7952	1.0000
-0.0126	0.4903	0.3725
-0.0554	0.6038	0.4495
-0.0094	0.2556	0.2000
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
-2.4531	31.1990	1.0000
0.0301	0.6338	0.4690
0.0060	0.3413	0.2647
2.6102	71.0809	1.0000
0.0063	0.7251	0.5260

Dependent Variable # 22

R Squared = 1

Regression Coefficient	t Statistic	Probability of error in accepting H0 (no correlation)
0.1816	0.7940	0.5666
0.0304	0.0991	0.0783
-0.7744	5.8140	1.0000
0.1063	0.2232	0.1751
0.0382	0.2010	0.1579
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
0.0000	0.0000	0
-0.0194	0.0476	0.0376
-0.0577	0.2343	0.1837
-0.0244	0.2684	0.2098
0.0000	0.0000	0
1.5194	33.8189	1.0000

3. COMPLETE MODEL ANALYSIS

The input data analysis is complete and has identified a strong correlation in variates 20, 21, and 22. Now the model has to be reset so that centering and scaling can be accomplished on the original variables.

First, we compute the probability of error in accepting the hypothesis that the individual coefficient is zero.

Regression Coefficient	Standard Error	t Statistic	Probability of error in accepting H_0 that Parameter = 0
23.5916	0.1961	120.276	1.0000
-0.6688	0.4064	1.6457	0.8730
-2.8421	0.4064	6.9940	1.0000
1.2431	0.4040	3.0769	0.9952
3.2934	0.1331	24.7378	1.0000
0.4903	0.1554	3.1553	0.9961
0.9549	0.1549	6.1659	1.0000
0.4136	0.1554	2.6617	0.9871
1.1496	0.1549	7.4236	1.0000
0.2268	0.1546	1.4665	0.8405
0.4035	0.1591	2.5365	0.9827
0.1970	0.1589	1.2393	0.7729
0.2011	0.1589	1.2659	0.7822
-0.2844	0.1589	1.7897	0.9159
2.4893	1.2461	1.9977	0.9443
-0.7888	0.3874	2.0365	0.9486
-2.7123	0.3846	7.0515	1.0000
0.7139	0.4508	1.5836	0.8641
5.8357	0.4508	12.9449	1.0000
0.7986	0.4497	1.7758	0.9136
-3.4234	1.2180	2.8108	0.9909
-5.8418	0.3928	14.8716	1.0000

Predicted Values and Residuals for the fit of the square root.

Obs	Actual	Estimate	Residual
1.0000	24.7992	25.4410	-0.6418
2.0000	13.8924	13.9641	-0.0716
3.0000	18.0831	18.4557	-0.3726
4.0000	7.2801	7.5530	-0.2729
5.0000	15.7162	15.6950	0.0213
6.0000	8.5440	8.4671	0.0769
7.0000	10.5357	10.8407	-0.3050
8.0000	6.8557	6.4619	0.3938
9.0000	20.8806	20.8571	0.0235
10.0000	15.0333	14.7921	0.2412
11.0000	17.9444	18.2516	-0.3072
12.0000	11.7473	11.1517	0.5956
13.0000	13.4164	13.5130	-0.0966
14.0000	10.7703	10.1213	0.6490
15.0000	9.8995	9.8104	0.0891
16.0000	8.1240	7.6586	0.4654
17.0000	23.7065	23.5916	0.1150
18.0000	20.9523	22.6123	-1.6600
19.0000	23.8747	22.7027	1.1720
20.0000	13.4536	14.7562	-1.3025
21.0000	21.5407	20.7435	0.7972
22.0000	20.4695	20.7610	-0.2916
23.0000	24.6374	24.8444	-0.2071
24.0000	15.4919	17.5859	-2.0939
25.0000	25.6515	24.1727	1.4788
26.0000	24.9199	25.1476	-0.2278
27.0000	20.5913	20.3127	0.2785
28.0000	22.6274	22.9967	-0.3693
29.0000	18.6279	18.3656	0.2623
30.0000	25.1794	25.6225	-0.4431
31.0000	22.1133	21.9752	0.1382
32.0000	23.8747	23.9440	-0.0693
33.0000	20.8327	20.8136	0.0191
34.0000	24.5357	24.6616	-0.1260
35.0000	21.0000	21.0719	-0.0719
36.0000	23.6643	23.3288	0.3355
37.0000	19.3132	19.7214	-0.4082
38.0000	25.5147	25.4488	0.0659
39.0000	22.9347	22.8345	0.1002
40.0000	24.5967	24.1759	0.4208
41.0000	21.7025	21.8571	-0.1546
42.0000	24.0832	24.2451	-0.1619
43.0000	24.1661	23.7548	0.4113
44.0000	23.9792	23.9180	0.0611
45.0000	23.0000	22.5349	0.4651
46.0000	22.6274	22.6435	-0.0161
47.0000	24.4336	24.1275	0.3061
48.0000	21.0000	21.0318	-0.0318
49.0000	25.2982	24.5785	0.7197

Mean Squared Error:	0.64151
Sum of Squares for the Residuals:	17.3209
R Squared Statistic:	0.99914
Adjusted R Squared Statistic:	0.99847

Results for the fit on the actual output

Actual Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	615.0000	647.2462	-32.2462
2.0000	193.0000	194.9956	-1.9956
3.0000	327.0000	340.6138	-13.6138
4.0000	53.0000	57.0475	-4.0475
5.0000	247.0000	246.3319	0.6681
6.0000	73.0000	71.6918	1.3082
7.0000	111.0000	117.5205	-6.5205
8.0000	47.0000	41.7557	5.2443
9.0000	436.0000	435.0181	0.9819
10.0000	226.0000	218.8074	7.1926
11.0000	322.0000	333.1194	-11.1194
12.0000	138.0000	124.3615	13.6385
13.0000	180.0000	182.6021	-2.6021
14.0000	116.0000	102.4409	13.5591
15.0000	98.0000	96.2433	1.7567
16.0000	66.0000	58.6544	7.3456
17.0000	562.0000	556.5621	5.4379
18.0000	439.0000	511.3182	-72.3182
19.0000	570.0000	515.4112	54.5888
20.0000	181.0000	217.7440	-36.7440
21.0000	464.0000	430.2908	33.7092
22.0000	419.0000	431.0208	-12.0208
23.0000	607.0000	617.2463	-10.2463
24.0000	240.0000	309.2633	-69.2633
25.0000	658.0000	584.3200	73.6800
26.0000	621.0000	632.4042	-11.4042
27.0000	424.0000	412.6072	11.3928
28.0000	512.0000	528.8469	-16.8469
29.0000	347.0000	337.2950	9.7050
30.0000	634.0000	656.5100	-22.5100
31.0000	489.0000	482.9079	6.0921
32.0000	570.0000	573.3143	-3.3143
33.0000	434.0000	433.2046	0.7954
34.0000	602.0000	608.1969	-6.1969
35.0000	441.0000	444.0229	-3.0229
36.0000	560.0000	544.2334	15.7666
37.0000	373.0000	388.9348	-15.9348
38.0000	651.0000	647.6396	3.3604
39.0000	526.0000	521.4125	4.5875
40.0000	605.0000	584.4764	20.5236
41.0000	471.0000	477.7325	-6.7325
42.0000	580.0000	587.8238	-7.8238
43.0000	584.0000	564.2907	19.7093
44.0000	575.0000	572.0718	2.9282
45.0000	529.0000	507.8214	21.1786
46.0000	512.0000	512.7291	-0.7291
47.0000	597.0000	582.1351	14.8649
48.0000	441.0000	442.3363	-1.3363
49.0000	640.0000	604.1050	35.8950

Maximum Absolute Error (Actual):	73.68
Average Error:	0.35349
Average Absolute Relative Error (Actual):	0.046558

Residual Analysis:

Maximum Absolute Error:	2.09395
Average Error:	-9.29868e-015
Standard Deviation of the Error:	0.60071
Average Absolute Relative Error:	0.023114

Figure 1.2.7. is a plot of the Residual Power Spectrum.

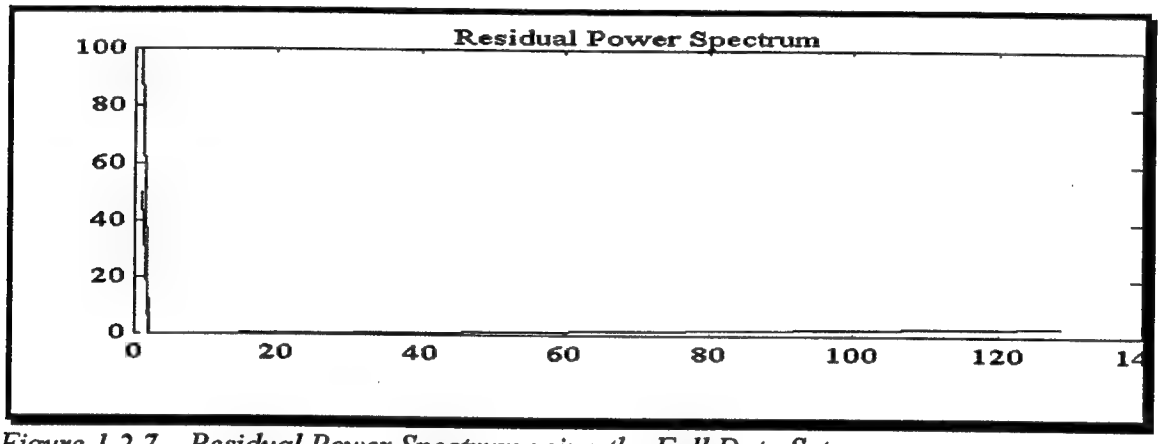

Figure 1.2.7. Residual Power Spectrum using the Full Data Set.

Figure 1.2.8. is a plot of the Residual Autocorrelation.

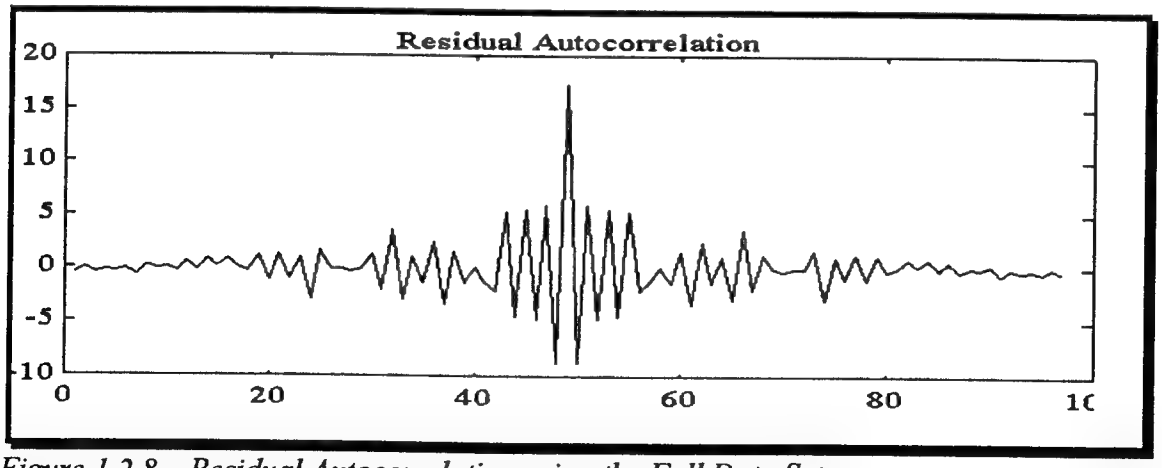

Figure 1.2.8. Residual Autocorrelation using the Full Data Set.

Figure 1.2.9. is a plot of the Residual Cumulative Probability Distribution.

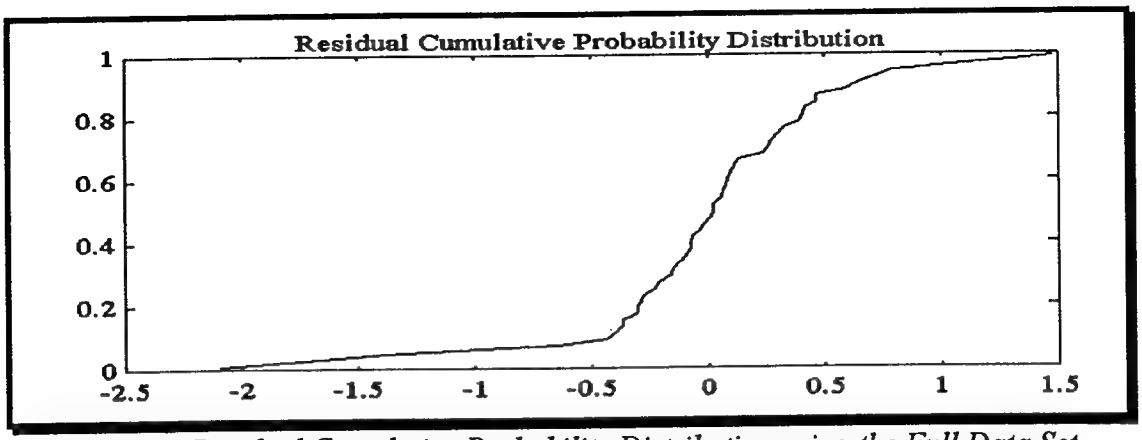

Figure 1.2.9. Residual Cumulative Probability Distribution using the Full Data Set.

4. MODEL ANALYSIS AFTER REMOVING VARIATES 20,21,22

Regression Coefficient	Standard Error	t Statistic	Probability of error in accepting H0 that Parameter = 0
24.4733	1.0764	22.7357	1.0000
-0.6688	3.0348	0.2204	0.1729
-2.8421	3.0348	0.9365	0.6434
1.9195	1.0055	1.9089	0.9345
3.2934	0.9943	3.3123	0.9976
0.4903	1.1605	0.4225	0.3243
0.9549	1.1566	0.8256	0.5844
0.4136	1.1605	0.3564	0.2760
1.1496	1.1566	0.9940	0.6717
0.2268	1.1548	0.1964	0.1544
0.4035	1.1881	0.3396	0.2635
0.1970	1.1871	0.1659	0.1307
0.2011	1.1866	0.1695	0.1335
-0.2844	1.1866	0.2396	0.1878
-3.0705	2.7294	1.1250	0.7300
-2.9832	2.7354	1.0906	0.7155
-4.6712	2.7416	1.7039	0.9022
0.7139	3.3669	0.2120	0.1665
5.8357	3.3669	1.7333	0.9075

Predicted Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	24.7992	25.7525	-0.9533
2.0000	13.8924	14.2755	-0.3831
3.0000	18.0831	19.0116	-0.9284
4.0000	7.2801	8.1088	-0.8287
5.0000	15.7162	16.0064	-0.2902
6.0000	8.5440	8.7785	-0.2345
7.0000	10.5357	11.3965	-0.8609
8.0000	6.8557	7.0177	-0.1621
9.0000	20.8806	21.1685	-0.2879
10.0000	15.0333	15.1036	-0.0703
11.0000	17.9444	18.8074	-0.8631
12.0000	11.7473	11.7076	0.0397
13.0000	13.4164	13.8245	-0.4081
14.0000	10.7703	10.4328	0.3376
15.0000	9.8995	10.3662	-0.4667
16.0000	8.1240	8.2145	-0.0904
17.0000	23.7065	24.4733	-0.7667
18.0000	20.9523	21.3576	-0.4053
19.0000	23.8747	21.4479	2.4268
20.0000	13.4536	21.4796	-8.0260
21.0000	21.5407	27.4669	-5.9263
22.0000	20.4695	19.5705	0.8989
23.0000	24.6374	23.4095	1.2278
24.0000	15.4919	16.5086	-1.0167
25.0000	25.6515	23.0954	2.5561
26.0000	24.9199	24.3163	0.6036
27.0000	20.5913	19.4814	1.1099
28.0000	22.6274	21.6871	0.9403
29.0000	18.6279	17.0561	1.5719
30.0000	25.1794	24.7911	0.3882
31.0000	22.1133	21.1438	0.9695
32.0000	23.8747	22.6345	1.2402
33.0000	20.8327	19.5040	1.3286
34.0000	24.5357	23.8303	0.7054
35.0000	21.0000	20.2405	0.7595
36.0000	23.6643	22.0193	1.6450
37.0000	19.3132	18.4119	0.9013
38.0000	25.5147	24.6174	0.8973
39.0000	22.9347	22.0031	0.9316
40.0000	24.5967	22.8664	1.7303
41.0000	21.7025	20.5476	1.1550
42.0000	24.0832	23.9508	0.1324
43.0000	24.1661	23.4605	0.7056
44.0000	23.9792	25.1648	-1.1857
45.0000	23.0000	23.7817	-0.7817
46.0000	22.6274	22.7129	-0.0855
47.0000	24.4336	24.6750	-0.2414
48.0000	21.0000	21.3455	-0.3455
49.0000	25.2982	24.8923	0.4060

Mean Squared Error:	4.79112
Sum of Squares for the Residuals:	143.734
R Squared Statistic:	0.99285
Adjusted R Squared Statistic:	0.98856

Results for the fit on the actual output

Actual Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	615.0000	663.1901	-48.1901
2.0000	193.0000	203.7907	-10.7907
3.0000	327.0000	361.4402	-34.4402
4.0000	53.0000	65.7532	-12.7532
5.0000	247.0000	256.2051	-9.2051
6.0000	73.0000	77.0628	-4.0628
7.0000	111.0000	129.8812	-18.8812
8.0000	47.0000	49.2483	-2.2483
9.0000	436.0000	448.1067	-12.1067
10.0000	226.0000	228.1182	-2.1182
11.0000	322.0000	353.7188	-31.7188
12.0000	138.0000	137.0680	0.9320
13.0000	180.0000	191.1162	-11.1162
14.0000	116.0000	108.8423	7.1577
15.0000	98.0000	107.4586	-9.4586
16.0000	66.0000	67.4775	-1.4775
17.0000	562.0000	598.9407	-36.9407
18.0000	439.0000	456.1466	-17.1466
19.0000	570.0000	460.0129	109.9871
20.0000	181.0000	461.3738	-280.3738
21.0000	464.0000	754.4314	-290.4314
22.0000	419.0000	383.0061	35.9939
23.0000	607.0000	548.0062	58.9938
24.0000	240.0000	272.5346	-32.5346
25.0000	658.0000	533.3998	124.6002
26.0000	621.0000	591.2832	29.7168
27.0000	424.0000	379.5251	44.4749
28.0000	512.0000	470.3321	41.6679
29.0000	347.0000	290.9094	56.0906
30.0000	634.0000	614.5996	19.4004
31.0000	489.0000	447.0618	41.9382
32.0000	570.0000	512.3185	57.6815
33.0000	434.0000	380.4075	53.5925
34.0000	602.0000	567.8840	34.1160
35.0000	441.0000	409.6786	31.3214
36.0000	560.0000	484.8488	75.1512
37.0000	373.0000	338.9981	34.0019
38.0000	651.0000	606.0180	44.9820
39.0000	526.0000	484.1376	41.8624
40.0000	605.0000	522.8731	82.1269
41.0000	471.0000	422.2024	48.7976
42.0000	580.0000	573.6395	6.3605
43.0000	584.0000	550.3950	33.6050
44.0000	575.0000	633.2686	-58.2686
45.0000	529.0000	565.5692	-36.5692
46.0000	512.0000	515.8743	-3.8743
47.0000	597.0000	608.8565	-11.8565
48.0000	441.0000	455.6307	-14.6307
49.0000	640.0000	619.6247	20.3753

Maximum Absolute Error (Actual):	290.431
Average Error:	2.93334
Average Absolute Relative Error (Actual):	0.12175

Residual Analysis

Maximum Absolute Error: 8.02599

Average Error: -1.31233e-014

Standard Deviation of the Error: 1.73045

Average Absolute Relative Error: 0.05674

Figure 1.2.10. is a plot of the Residual Power Spectrum excluding variates 20, 21,22.

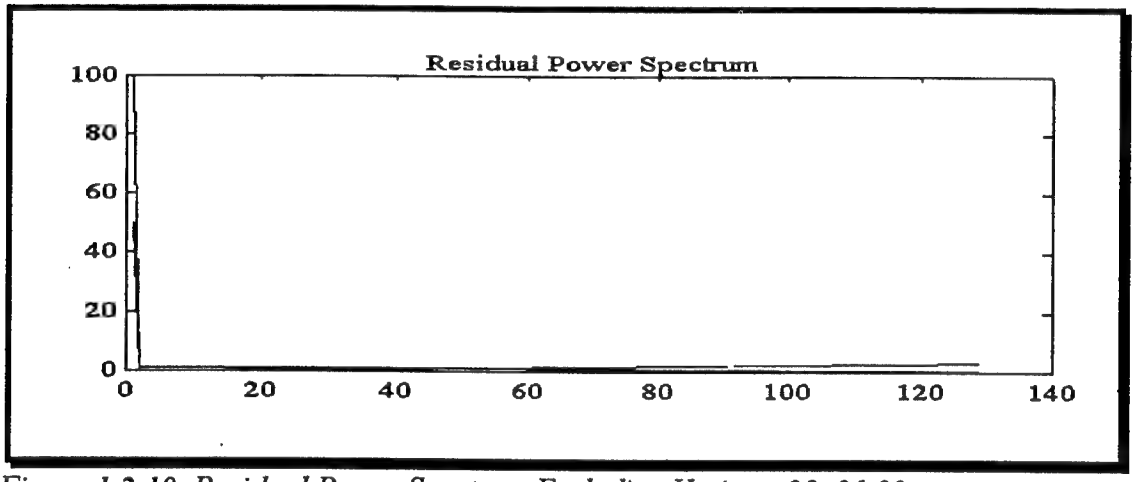

Figure 1.2.10. Residual Power Spectrum Excluding Variates 20, 21,22.

Figure 1.2.11. is a plot of the Residual Autocorrelation excluding variates 20, 21,22.

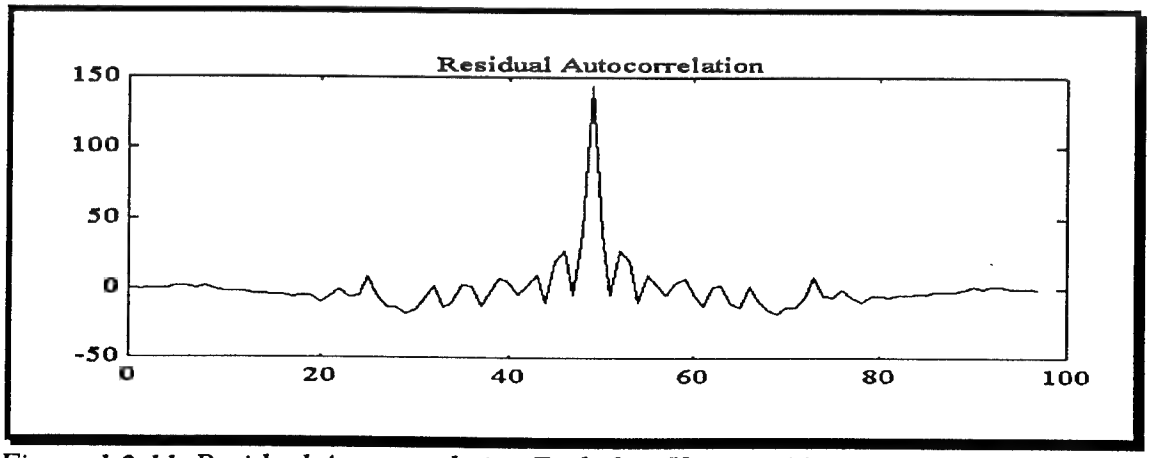

Figure 1.2.11. Residual Autocorrelation Excluding Variates 20, 21,22.

Figure 1.2.12. is a plot of the Residual Cumulative Probability Distribution excluding variates 20, 21,22.

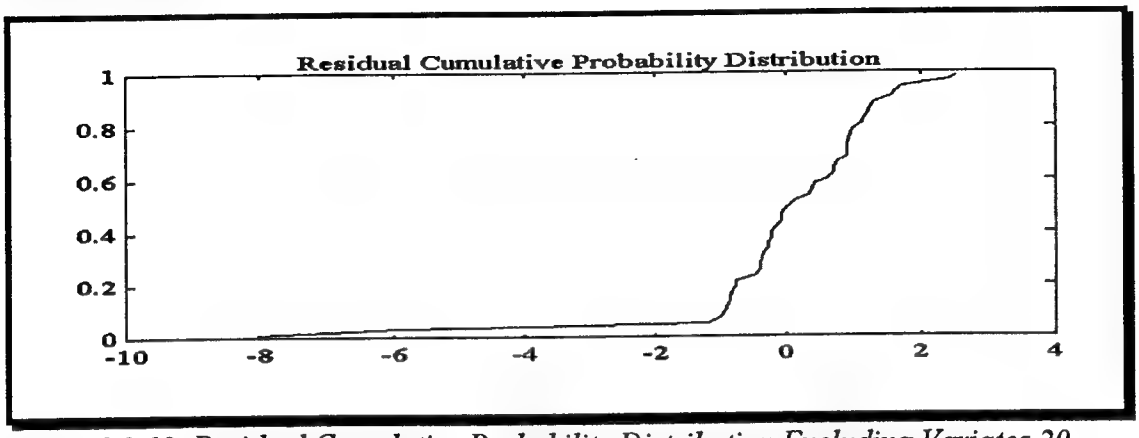

Figure 1.2.12. Residual Cumulative Probability Distribution Excluding Variates 20, 21,22.

5. MODEL ANALYSIS AFTER REMOVING VARIATE 22

Regression Coefficient	Standard Error	t Statistic	Probability of error in accepting H0 that Parameter = 0
23.2776	1.1762	19.7912	1.0000
-0.6688	2.4509	0.2729	0.2130
-2.8421	2.4509	1.1596	0.7433
1.2431	2.4367	0.5101	0.3860
3.2934	0.8030	4.1015	0.9997
0.4903	0.9372	0.5231	0.3950
0.9549	0.9341	1.0223	0.6844
0.4136	0.9372	0.4413	0.3376
1.1496	0.9341	1.2308	0.7702
0.2268	0.9326	0.2432	0.1903
0.4035	0.9595	0.4205	0.3227
0.1970	0.9587	0.2055	0.1613
0.2011	0.9583	0.2099	0.1647
-0.2844	0.9583	0.2967	0.2311
7.3559	7.2520	1.0143	0.6807
-2.4447	2.2377	1.0925	0.7157
-4.3231	2.2260	1.9421	0.9381
0.7139	2.7190	0.2626	0.2052
5.8357	2.7190	2.1462	0.9595
0.7986	2.7125	0.2944	0.2294
-10.2650	6.8019	1.5091	0.8503

Predicted Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	24.7992	25.7272	-0.9280
2.0000	13.8924	14.2502	-0.3578
3.0000	18.0831	18.7418	-0.6587
4.0000	7.2801	7.8391	-0.5590
5.0000	15.7162	15.9811	-0.2648
6.0000	8.5440	8.7532	-0.2092
7.0000	10.5357	11.1268	-0.5912
8.0000	6.8557	6.7480	0.1077
9.0000	20.8806	21.1432	-0.2626
10.0000	15.0333	15.0783	-0.0450
11.0000	17.9444	18.5377	-0.5933
12.0000	11.7473	11.4379	0.3095
13.0000	13.4164	13.7992	-0.3827
14.0000	10.7703	10.4074	0.3629
15.0000	9.8995	10.0965	-0.1970
16.0000	8.1240	7.9447	0.1793
17.0000	23.7065	23.2776	0.4289
18.0000	20.9523	20.3234	0.6289
19.0000	23.8747	20.4137	3.4609
20.0000	13.4536	20.2840	-6.8304
21.0000	21.5407	26.2713	-4.7306
22.0000	20.4695	18.7912	1.6783
23.0000	24.6374	22.8746	1.7627
24.0000	15.4919	15.6611	-0.1692
25.0000	25.6515	22.2480	3.4036

Obs	Actual	Estimate	Residual
26.0000	24.9199	25.0883	-0.1684
27.0000	20.5913	20.2533	0.3379
28.0000	22.6274	22.9373	-0.3099
29.0000	18.6279	18.3062	0.3217
30.0000	25.1794	25.5631	-0.3837
31.0000	22.1133	21.9158	0.1976
32.0000	23.8747	23.8846	-0.0099
33.0000	20.8327	20.7542	0.0785
34.0000	24.5357	24.6023	-0.0666
35.0000	21.0000	21.0125	-0.0125
36.0000	23.6643	23.2694	0.3949
37.0000	19.3132	19.6620	-0.3488
38.0000	25.5147	25.3894	0.1253
39.0000	22.9347	22.7751	0.1596
40.0000	24.5967	24.1166	0.4802
41.0000	21.7025	21.7977	-0.0952
42.0000	24.0832	24.7202	-0.6370
43.0000	24.1661	24.2299	-0.0638
44.0000	23.9792	23.9692	0.0100
45.0000	23.0000	22.5861	0.4139
46.0000	22.6274	21.8970	0.7304
47.0000	24.4336	23.3810	1.0526
48.0000	21.0000	20.2508	0.7492
49.0000	25.2982	23.7976	1.5006

Mean Squared Error :	3.86925
Sum of Squares for the Residuals:	108.339
R Squared Statistic:	0.99461
Adjusted R Squared Statistic:	0.99076

Results for the fit on the actual output

Actual Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	615.0000	661.8863	-46.8863
2.0000	193.0000	203.0682	-10.0682
3.0000	327.0000	351.2567	-24.2567
4.0000	53.0000	61.4514	-8.4514
5.0000	247.0000	255.3950	-8.3950
6.0000	73.0000	76.6188	-3.6188
7.0000	111.0000	123.8058	-12.8058
8.0000	47.0000	45.5352	1.4648
9.0000	436.0000	447.0352	-11.0352
10.0000	226.0000	227.3538	-1.3538
11.0000	322.0000	343.6455	-21.6455
12.0000	138.0000	130.8248	7.1752
13.0000	180.0000	190.4166	-10.4166
14.0000	116.0000	108.3145	7.6855
15.0000	98.0000	101.9390	-3.9390
16.0000	66.0000	63.1188	2.8812
17.0000	562.0000	541.8484	20.1516
18.0000	439.0000	413.0407	25.9593
19.0000	570.0000	416.7202	153.2798
20.0000	181.0000	411.4401	-230.4401
21.0000	464.0000	690.1805	-226.1805
22.0000	419.0000	353.1102	65.8898
23.0000	607.0000	523.2486	83.7514
24.0000	240.0000	245.2710	-5.2710
25.0000	658.0000	494.9717	163.0283
26.0000	621.0000	629.4207	-8.4207
27.0000	424.0000	410.1980	13.8020
28.0000	512.0000	526.1189	-14.1189
29.0000	347.0000	335.1171	11.8829
30.0000	634.0000	653.4701	-19.4701
31.0000	489.0000	480.3013	8.6987
32.0000	570.0000	570.4738	-0.4738
33.0000	434.0000	430.7359	3.2641
34.0000	602.0000	605.2712	-3.2712
35.0000	441.0000	441.5235	-0.5235
36.0000	560.0000	541.4660	18.5340
37.0000	373.0000	386.5958	-13.5958
38.0000	651.0000	644.6203	6.3797
39.0000	526.0000	518.7037	7.2963
40.0000	605.0000	581.6084	23.3916
41.0000	471.0000	475.1398	-4.1398
42.0000	580.0000	611.0880	-31.0880
43.0000	584.0000	587.0891	-3.0891
44.0000	575.0000	574.5226	0.4774
45.0000	529.0000	510.1306	18.8694
46.0000	512.0000	479.4794	32.5206
47.0000	597.0000	546.6698	50.3302
48.0000	441.0000	410.0957	30.9043
49.0000	640.0000	566.3245	73.6755

Maximum Absolute Error (Actual):	230.44
Average Error:	2.211
Average Absolute Relative Error (Actual):	0.0894

Residual Analysis

Maximum Absolute Error: 6.83036

Average Error: -8.91804e-015

Standard Deviation of the Error: 1.50235

Average Absolute Relative Error: 0.042049

Figure 1.2.13 is a plot of the Residual Power Spectrum with variate 22 removed.

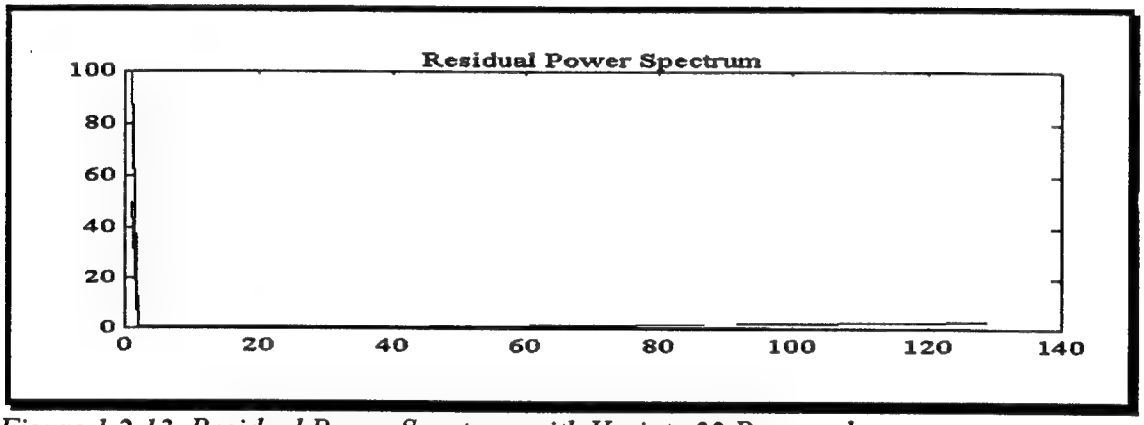

Figure 1.2.13. Residual Power Spectrum with Variate 22 Removed.

Figure 1.2.14 is a plot of the Residual Autocorrelation with variate 22 removed.

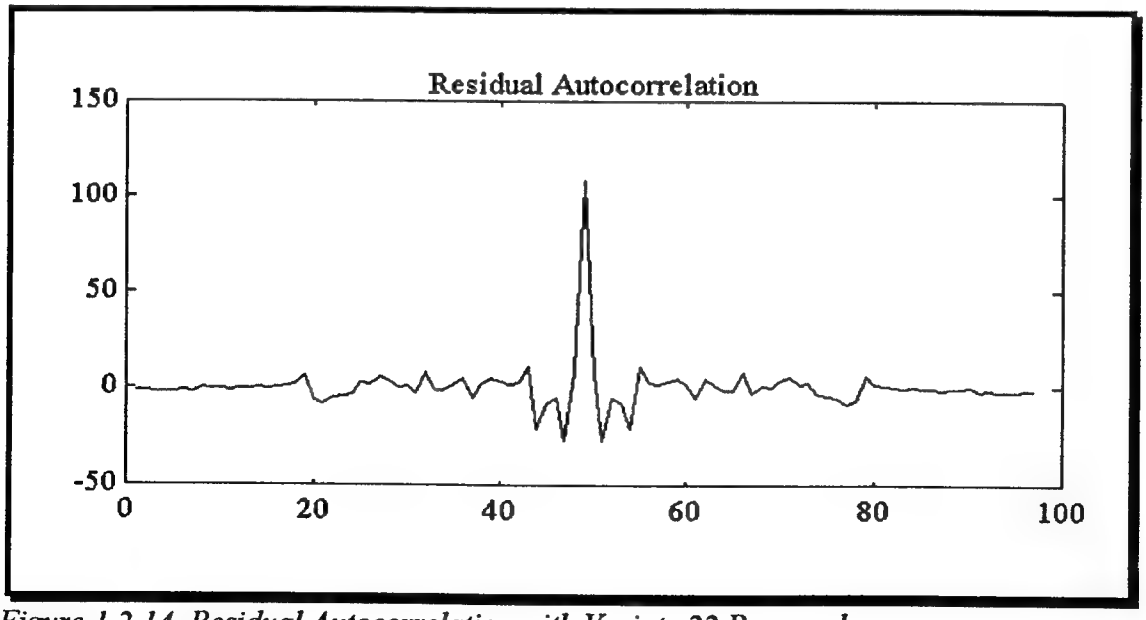

Figure 1.2.14. Residual Autocorrelation with Variate 22 Removed.

Figure 1.2.15 is a plot of the Residual Cumulative Probability Distribution with variate 22 removed.

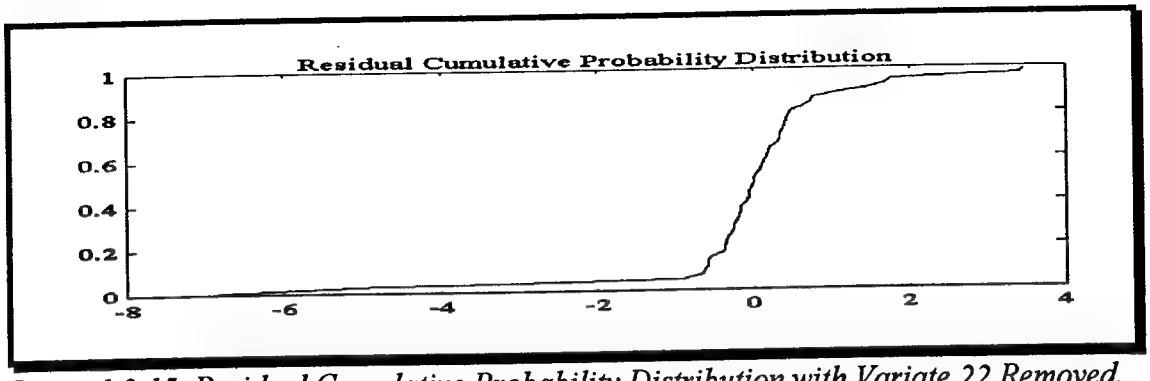

Figure 1.2.15. Residual Cumulative Probability Distribution with Variate 22 Removed.

6. MODEL ANALYSIS AFTER REMOVING VARIATE 21

Regression Coefficient	Standard Error	t Statistic	Probability of error in accepting H0 that Parameter = 0
23.9558	0.1686	142.0665	1.0000
-0.6688	0.4654	1.4370	0.8336
-2.8421	0.4654	6.1068	1.0000
1.2431	0.4627	2.6865	0.9880
3.2934	0.1525	21.5996	1.0000
0.4903	0.1780	2.7550	0.9898
0.9549	0.1774	5.3837	1.0000
0.4136	0.1780	2.3241	0.9725
1.1496	0.1774	6.4818	1.0000
0.2268	0.1771	1.2805	0.7875
0.4035	0.1822	2.2147	0.9650
0.1970	0.1820	1.0821	0.7112
0.2011	0.1820	1.1053	0.7212
-0.2844	0.1820	1.5627	0.8608
-0.8392	0.4441	1.8896	0.9312
-0.8246	0.4434	1.8597	0.9270
-2.6968	0.4405	6.1225	1.0000
0.7139	0.5163	1.3827	0.8191
5.8357	0.5163	11.3027	1.0000
0.7986	0.5151	1.5506	0.8586
-6.2588	0.4166	15.0250	1.0000

Predicted Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	24.7992	25.4628	-0.6636
2.0000	13.8924	13.9858	-0.0934
3.0000	18.0831	18.4775	-0.3943
4.0000	7.2801	7.5747	-0.2946
5.0000	15.7162	15.7167	-0.0005
6.0000	8.5440	8.4889	0.0551
7.0000	10.5357	10.8624	-0.3268
8.0000	6.8557	6.4836	0.3720
9.0000	20.8806	20.8788	0.0018
10.0000	15.0333	14.8139	0.2194
11.0000	17.9444	18.2733	-0.3290
12.0000	11.7473	11.1735	0.5738
13.0000	13.4164	13.5348	-0.1184
14.0000	10.7703	10.1431	0.6273
15.0000	9.8995	9.8321	0.0674
16.0000	8.1240	7.6804	0.4437
17.0000	23.7065	23.9558	-0.2493
18.0000	20.9523	23.0714	-2.1191
19.0000	23.8747	23.1618	0.7129
20.0000	13.4536	14.7034	-1.2498
21.0000	21.5407	20.6907	0.8500
22.0000	20.4695	21.0895	-0.6201
23.0000	24.6374	25.1729	-0.5356
24.0000	15.4919	17.9656	-2.4737

Obs	Actual	Estimate	Residual
25.0000	25.6515	24.5524	1.0991
26.0000	24.9199	24.8628	0.0571
27.0000	20.5913	20.0279	0.5634
28.0000	22.6274	22.7118	-0.0844
29.0000	18.6279	18.0808	0.5472
30.0000	25.1794	25.3376	-0.1583
31.0000	22.1133	21.6903	0.4230
32.0000	23.8747	23.6591	0.2155
33.0000	20.8327	20.5287	0.3039
34.0000	24.5357	24.3768	0.1589
35.0000	21.0000	20.7870	0.2130
36.0000	23.6643	23.0440	0.6203
37.0000	19.3132	19.4366	-0.1234
38.0000	25.5147	25.1639	0.3508
39.0000	22.9347	22.5496	0.3851
40.0000	24.5967	23.8911	0.7056
41.0000	21.7025	21.5723	0.1303
42.0000	24.0832	23.9912	0.0920
43.0000	24.1661	23.5009	0.6652
44.0000	23.9792	24.2562	-0.2771
45.0000	23.0000	22.8731	0.1269
46.0000	22.6274	22.9984	-0.3710
47.0000	24.4336	24.4824	-0.0488
48.0000	21.0000	21.4005	-0.4005
49.0000	25.2982	24.9473	0.3509

Mean Squared Error:	0.73472
Sum of Squares for the Residuals:	20.5722
R Squared Statistic:	0.99898
Adjusted R Squared Statistic:	0.99825

Results for the fit on the actual output

Actual Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	615.0000	648.3537	-33.3537
2.0000	193.0000	195.6037	-2.6037
3.0000	327.0000	341.4174	-14.4174
4.0000	53.0000	57.3766	-4.3766
5.0000	247.0000	247.0153	-0.0153
6.0000	73.0000	72.0607	0.9393
7.0000	111.0000	117.9927	-6.9927
8.0000	47.0000	42.0373	4.9627
9.0000	436.0000	435.9261	0.0739
10.0000	226.0000	219.4515	6.5485
11.0000	322.0000	333.9141	-11.9141
12.0000	138.0000	124.8472	13.1528
13.0000	180.0000	183.1906	-3.1906
14.0000	116.0000	102.8818	13.1182
15.0000	98.0000	96.6707	1.3293
16.0000	66.0000	58.9881	7.0119
17.0000	562.0000	573.8820	-11.8820
18.0000	439.0000	532.2917	-93.2917
19.0000	570.0000	536.4676	33.5324
20.0000	181.0000	216.1894	-35.1894
21.0000	464.0000	428.1043	35.8957
22.0000	419.0000	444.7690	-25.7690
23.0000	607.0000	633.6773	-26.6773
24.0000	240.0000	322.7630	-82.7630
25.0000	658.0000	602.8220	55.1780
26.0000	621.0000	618.1593	2.8407
27.0000	424.0000	401.1166	22.8834
28.0000	512.0000	515.8273	-3.8273
29.0000	347.0000	326.9137	20.0863
30.0000	634.0000	641.9946	-7.9946
31.0000	489.0000	470.4703	18.5297
32.0000	570.0000	559.7551	10.2449
33.0000	434.0000	421.4287	12.5713
34.0000	602.0000	594.2289	7.7711
35.0000	441.0000	432.0999	8.9001
36.0000	560.0000	531.0247	28.9753
37.0000	373.0000	377.7811	-4.7811
38.0000	651.0000	633.2232	17.7768
39.0000	526.0000	508.4854	17.5146
40.0000	605.0000	570.7851	34.2149
41.0000	471.0000	465.3621	5.6379
42.0000	580.0000	575.5760	4.4240
43.0000	584.0000	552.2919	31.7081
44.0000	575.0000	588.3644	-13.3644
45.0000	529.0000	523.1785	5.8215
46.0000	512.0000	528.9286	-16.9286
47.0000	597.0000	599.3879	-2.3879
48.0000	441.0000	457.9832	-16.9832
49.0000	640.0000	622.3675	17.6325

Maximum Absolute Error (Actual):	93.2917
Average Error:	0.41984
Average Absolute Relative Error (Actual):	0.051711

Residual Analysis

Maximum Absolute Error: 2.47367

Average Error: -1.064e-014

Standard Deviation of the Error: 0.65467

Average Absolute Relative Error: 0.025557

Figure 1.2.16 is a plot of the Residual Power Spectrum with variate 21 removed.

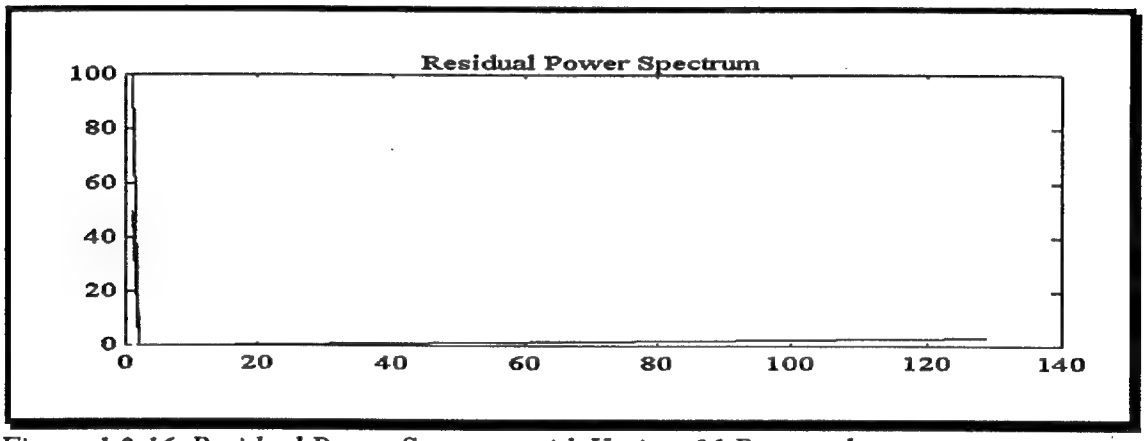

Figure 1.2.16. Residual Power Spectrum with Variate 21 Removed.

Figure 1.2.17 is a plot of the Residual Autocorrelation with variate 21 removed.

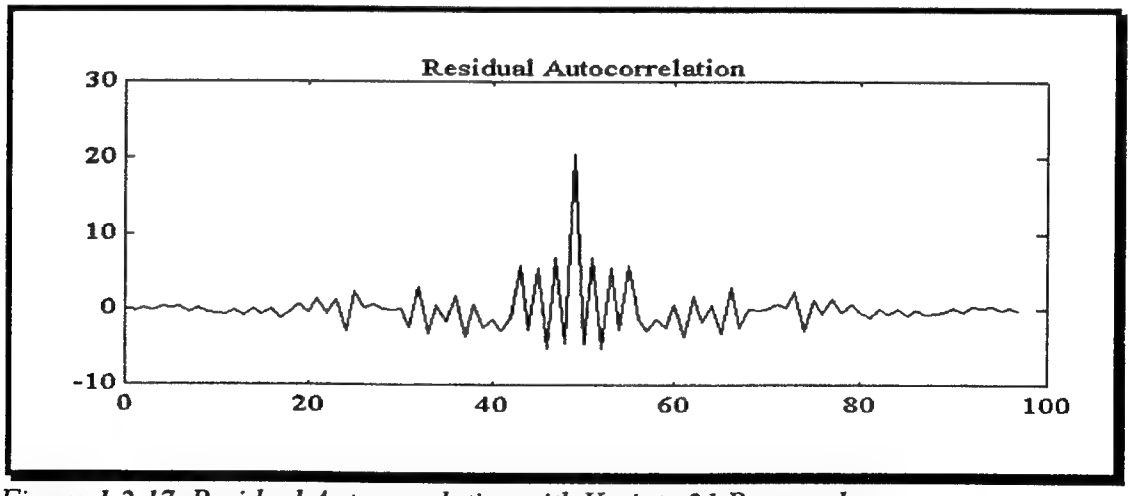

Figure 1.2.17. Residual Autocorrelation with Variate 21 Removed.

Figure 1.2.18 is a plot of the Residual Cumulative Probability Distribution with variate 21 removed.

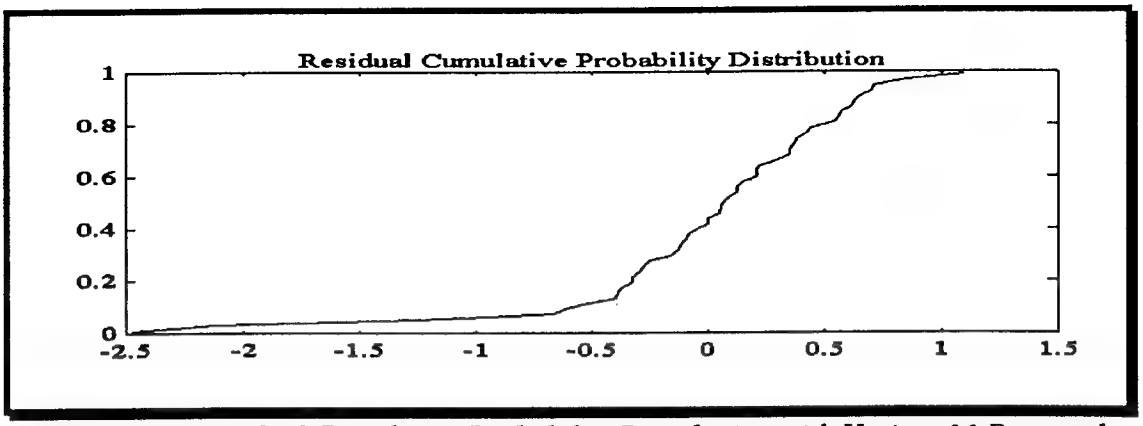

Figure 1.2.18. Residual Cumulative Probability Distribution with Variate 21 Removed.

7. MODEL ANALYSIS AFTER REMOVING VARIATE 20

Variates number 20 has been removed.

Regression Coefficient	Standard Error	t Statistic that Parameter = 0	Probability of error in accepting H0
23.5916	0.2033	116.0363	1.0000
-0.6688	0.4212	1.5877	0.8650
-2.8421	0.4212	6.7475	1.0000
1.9195	0.1396	13.7540	1.0000
3.2934	0.1380	23.8658	1.0000
0.4903	0.1611	3.0441	0.9950
0.9549	0.1605	5.9486	1.0000
0.4136	0.1611	2.5679	0.9842
1.1496	0.1605	7.1619	1.0000
0.2268	0.1603	1.4149	0.8279
0.4035	0.1649	2.4471	0.9791
0.1970	0.1648	1.1956	0.7573
0.2011	0.1647	1.2213	0.7668
-0.2844	0.1647	1.7266	0.9056
2.4893	1.2916	1.9273	0.9362
-0.7888	0.4015	1.9647	0.9408
-2.7123	0.3987	6.8029	1.0000
0.7139	0.4673	1.5278	0.8542
5.8357	0.4673	12.4886	1.0000
-3.4234	1.2625	2.7117	0.9887
-5.8418	0.4072	14.3474	1.0000

Predicted Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	24.7992	25.3188	-0.5196
2.0000	13.8924	13.8419	0.0506
3.0000	18.0831	18.5779	-0.4948
4.0000	7.2801	7.6752	-0.3951
5.0000	15.7162	15.5728	0.1435
6.0000	8.5440	8.3449	0.1991
7.0000	10.5357	10.9629	-0.4272
8.0000	6.8557	6.5841	0.2716
9.0000	20.8806	20.7349	0.1457
10.0000	15.0333	14.6699	0.3634
11.0000	17.9444	18.3738	-0.4294
12.0000	11.7473	11.2740	0.4734
13.0000	13.4164	13.3908	0.0256
14.0000	10.7703	9.9991	0.7712
15.0000	9.8995	9.9326	-0.0331
16.0000	8.1240	7.7808	0.3432
17.0000	23.7065	23.5916	0.1150
18.0000	20.9523	22.6123	-1.6600
19.0000	23.8747	22.7027	1.1720
20.0000	13.4536	14.7562	-1.3025
21.0000	21.5407	20.7435	0.7972
22.0000	20.4695	20.8832	-0.4138
23.0000	24.6374	24.7222	-0.0849
24.0000	15.4919	17.5859	-2.0939
25.0000	25.6515	24.1727	1.4788
26.0000	24.9199	25.3867	-0.4669
27.0000	20.5913	20.5518	0.0394
28.0000	22.6274	22.7576	-0.1302
29.0000	18.6279	18.1265	0.5014
30.0000	25.1794	25.8615	-0.6822
31.0000	22.1133	22.2143	-0.1009
32.0000	23.8747	23.7049	0.1698
33.0000	20.8327	20.5745	0.2582
34.0000	24.5357	24.9007	-0.3651
35.0000	21.0000	21.3109	-0.3109
36.0000	23.6643	23.0897	0.5746
37.0000	19.3132	19.4823	-0.1691
38.0000	25.5147	25.6879	-0.1732
39.0000	22.9347	23.0736	-0.1389
40.0000	24.5967	23.9368	0.6599
41.0000	21.7025	21.6180	0.0845
42.0000	24.0832	24.2451	-0.1619
43.0000	24.1661	23.7548	0.4113
44.0000	23.9792	23.9180	0.0611
45.0000	23.0000	22.5349	0.4651
46.0000	22.6274	22.4044	0.2230
47.0000	24.4336	24.3666	0.0670
48.0000	21.0000	21.0318	-0.0318
49.0000	25.2982	24.5785	0.7197

Mean Squared Error:	0.66495
Sum of Squares for the Residuals:	18.6187
R Squared Statistic:	0.99907
Adjusted R Squared Statistic:	0.99841

Results for the fit on the actual output

Actual Values and Residuals

Obs	Actual	Estimate	Residual
1.0000	615.0000	641.0430	-26.0430
2.0000	193.0000	191.5976	1.4024
3.0000	327.0000	345.1396	-18.1396
4.0000	53.0000	58.9085	-5.9085
5.0000	247.0000	242.5108	4.4892
6.0000	73.0000	69.6373	3.3627
7.0000	111.0000	120.1850	-9.1850
8.0000	47.0000	43.3499	3.6501
9.0000	436.0000	429.9353	6.0647
10.0000	226.0000	215.2069	10.7931
11.0000	322.0000	337.5953	-15.5953
12.0000	138.0000	127.1020	10.8980
13.0000	180.0000	179.3143	0.6857
14.0000	116.0000	99.9821	16.0179
15.0000	98.0000	98.6560	-0.6560
16.0000	66.0000	60.5412	5.4588
17.0000	562.0000	556.5621	5.4379
18.0000	439.0000	511.3182	-72.3182
19.0000	570.0000	515.4112	54.5888
20.0000	181.0000	217.7440	-36.7440
21.0000	464.0000	430.2908	33.7092
22.0000	419.0000	436.1100	-17.1100
23.0000	607.0000	611.1890	-4.1890
24.0000	240.0000	309.2633	-69.2633
25.0000	658.0000	584.3200	73.6800
26.0000	621.0000	644.4869	-23.4869
27.0000	424.0000	422.3778	1.6222
28.0000	512.0000	517.9071	-5.9071
29.0000	347.0000	328.5698	18.4302
30.0000	634.0000	668.8197	-34.8197
31.0000	489.0000	493.4736	-4.4736
32.0000	570.0000	561.9216	8.0784
33.0000	434.0000	423.3088	10.6912
34.0000	602.0000	620.0472	-18.0472
35.0000	441.0000	454.1565	-13.1565
36.0000	560.0000	533.1348	26.8652
37.0000	373.0000	379.5612	-6.5612
38.0000	651.0000	659.8663	-8.8663
39.0000	526.0000	532.3890	-6.3890
40.0000	605.0000	572.9727	32.0273
41.0000	471.0000	467.3376	3.6624
42.0000	580.0000	587.8238	-7.8238
43.0000	584.0000	564.2907	19.7093
44.0000	575.0000	572.0718	2.9282
45.0000	529.0000	507.8214	21.1786
46.0000	512.0000	501.9582	10.0418
47.0000	597.0000	593.7300	3.2700
48.0000	441.0000	442.3363	-1.3363
49.0000	640.0000	604.1050	35.8950

Maximum Absolute Error (Actual):	73.68
Average Error:	0.37997
Average Absolute Relative Error (Actual):	0.050068

Residual Analysis

Maximum Absolute Error:	2.09395
Average Error:	-8.57364e-015
Standard Deviation of the Error:	0.62281
Average Absolute Relative Error:	0.024829

Figure 1.2.19 is a plot of the Residual Power Spectrum, Figure 1.2.20 is a plot of the Residual Autocorrelation, and Figure 1.2.21 is a plot of the Residual Cumulative Probability Distribution. All plots have the effects of variate 20 removed.

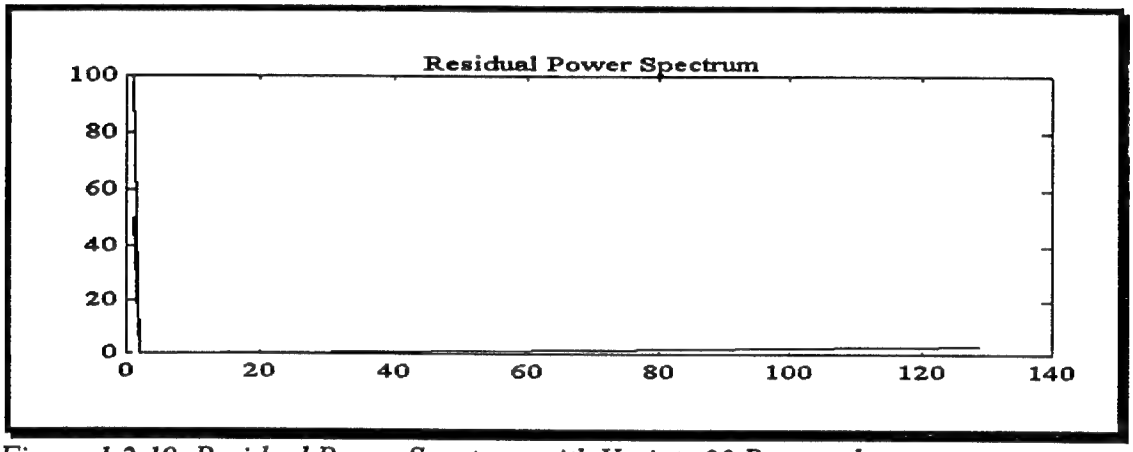

Figure 1.2.19. Residual Power Spectrum with Variate 20 Removed.

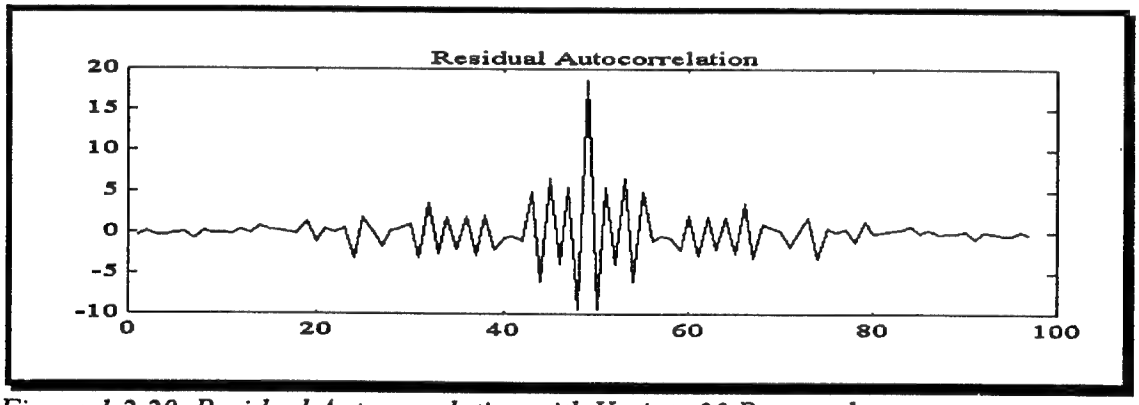

Figure 1.2.20. Residual Autocorrelation with Variate 20 Removed.

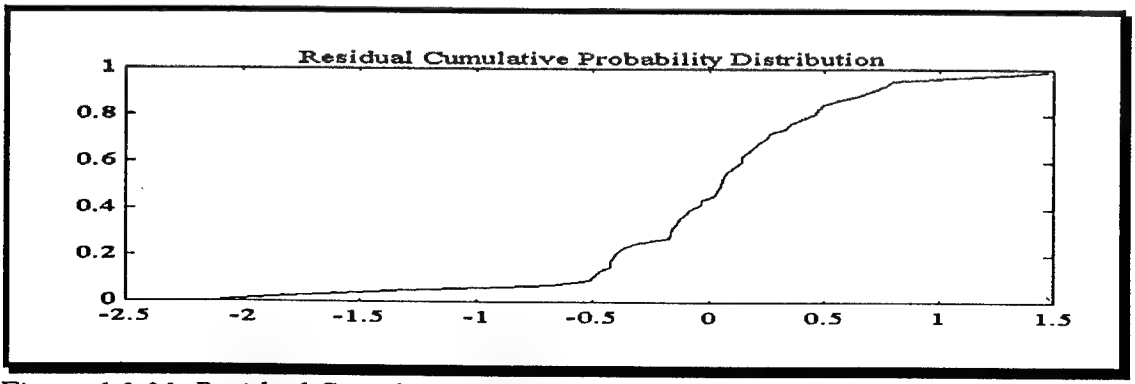

Figure 1.2.21. Residual Cumulative Probability Distribution with Variate 20 Removed.

8. REFERENCES

1. M. A. Zeimer, et al, "Metamodel Procedures for Air Engagement Simulation Models," *IRAE Technical Report*, January 1993.

2. D. Belsley, E. Kuh, R. Welsch, *Regression Diagnostics, Identifying Influential Data and Sources of Collinearity*, John Wiley & Sons, New York, 1980.

CHAPTER 2

ASA LEAST SQUARES METAMODEL

1. PREVIOUS WORK

Previous work with this simulation resulted in a metamodel that provided an estimate of the number of emitters found with a CEP of 5 nautical miles (nm) or less [1]. This metamodel was generated by a Least Squares fit of selected input data and the number of emitters reported with a CEP of 5 nm or less. The inputs were aircraft altitude and velocity, azimuth coverage and channel capacity of the sensor. These inputs were combined to generate a nonlinear system with 22 inputs (up to the fourth order of a single input) to produce the square root of the number of emitters with a CEP of 5nm or less. Using a 2 layer Central Composite Experimental Design, the following model was obtained:

$$\begin{aligned}\sqrt{y} = \quad & 23.567 - 0.669x_1 - 2.842x_2 + 1.298x_3 + 3.344x_4 \\ & -0.491x_1x_3 + 0.963x_1x_4 + 0.414x_2x_3 + 1.155x_2x_4 \\ & +0.231x_3x_4 + 0.404x_1x_2x_3 + 0.198x_1x_2x_4 + 0.201x_1x_3x_4 \\ & -0.285x_2x_3x_4 + 2.037x_1^2 - 0.788x_3^2 - 2.743x_4^2 + 0.714x_1^3 \\ & +5.836x_2^3 + 0.744x_3^3 - 2.947x_1^4 - 5.823x_2^4\end{aligned}$$

where

x_1 = ***Altitude***
x_2 = ***Velocity***
x_3 = ***Azimuth***
x_4 = ***Channel Capacity***

The model provided an excellent fit with an R^2 of 98.9%, Maximum Absolute Error of 73.51 emitters, and an Average Absolute Relative Error of 4.7%. This is a good example of a Metamodel that can be used to explore the effect of the different input variables on the output via Surface Response Methodology or Capability Based Analysis. It has not, however, identified the system simulated by TERSM. As such, its utility for simplifying or coupling simulations, further analysis, or updating knowledge bases in expert systems is limited. Also, the domain of validity (range of the response) is not guaranteed outside of the area of the fit.

ASA was used to verify that the noise statistics of the simulation output were close enough to the assumptions of the Least Squares technique to allow a global minimum.

2. ASA METAMODEL

The ASA code was ported to an SGI Crimson, and the user input code was modified to load the input data shown in Table 2.2.1.

Table 2.2.1. Input-Output Data for Construction of the Static Least Squares Metamodel.

ALTITUDE (x_1)	VELOCITY (x_2)	AZIMUTH COVERAGE (x_3)	CHANNEL CAPACITY (x_4)	EMITTERS FOUND < 5NM (y)
40000	1150	150	30	615
40000	1150	150	4	193
40000	1150	60	30	327
40000	1150	60	4	53
40000	186	150	30	247
40000	186	150	4	73
40000	186	60	30	111
40000	186	60	4	47
5000	1150	150	30	436
5000	1150	150	4	226
5000	1150	60	30	322
5000	1150	60	4	138
5000	186	150	30	180
5000	186	150	4	116
5000	186	60	30	98
5000	186	60	4	66
22500	668	105	17	562
5000	668	105	17	439
40000	668	105	17	570
22500	186	105	17	181
22500	1150	105	17	464
22500	668	60	17	419
22500	668	150	17	607
22500	668	105	4	240
22500	668	105	30	658
31250	909	128	24	621
31250	909	128	10	424
31250	909	82	24	512
31250	909	82	10	347
31250	427	128	24	634
31250	427	128	10	489
31250	427	82	24	570
31250	427	82	10	434
13750	909	128	24	602
13750	909	128	10	441
13750	909	82	24	560
13750	909	82	10	373
13750	427	128	24	651
13750	427	128	10	526
13750	427	82	24	605
13750	427	82	10	471
13750	668	105	17	580
31250	668	105	17	584
22500	427	105	17	575
22500	909	105	17	529
22500	668	82	17	512
22500	668	128	17	597
22500	668	105	10	441
22500	668	105	24	640

the cost function was modified as shown in Figure 2.2.1 to perform a minimum mean square error fit of the TERSM data.

```
/* Least squares fit of the TERSM Data using parameters from model #7
* The data input (combinations of inx) for the parameters are in B
* The parameters to be determined are in xi*/

double err,YI;
LONG_INT i,j;

err = 0 ;
for (i = 0; i < DATA_LIMIT; ++i)
    {
    YI = 0 ;
    for (j = 0; j < ARRAY_LIMIT; ++j)
        {
        YI = YI + (x[j] * B[i][j]) ;
        }
    err = err + (sqrt(Y[i]) - YI)*(sqrt(Y[i]) - YI) ;
    }
err = err / DATA_LIMIT ;
return (err);
```

Figure 2.2.1. Cost Function for the Static Least Squares Metamodel.

The initial run used the default initial temperature, initial parameter values of zero, and parameter boundaries of ±50. ASA ran for 3 days (almost exclusively) and generated 62MB of intermediate output data. The program was terminated by the user. It had not found a minimum, but also had not encountered one of the error conditions (parameter temperature too small, repeating cost, etc.) that would cause the search to terminate. The parameter coefficients from this run (with the Least Squares results in parentheses) resulted in a Maximum Absolute Error of 369.88 (73.9) emitters, an Average Error of -3.7 (2.82) emitters, and an Average Absolute Relative Error of 4.7% (4.85%). No improvement.

Successive refinements in the initial conditions resulted in significant improvements in the run time and performance of the optimization. The final run initialized the parameters at the Least Squares values, and established the boundary conditions of the search at the parameter covariance provided by Least Squares.

ASA terminated with a "cost repeating" error after 11 reannealing attempts and a 3 minute, 53 second run time.

ASA did find a lower cost fit than the Least Squares technique. The improvement provided by ASA was in line with expectations considering the quality of the Least Squares model. The Maximum Absolute Error was reduced by 1.4%, the Average Error was reduced by 91.8% (to .2234), and the Average Absolute Relative Error was reduced by 3.5%.

3. RESULTS AND CONCLUSIONS

Initialized properly, ASA provided advertised results at a reasonable cost. The ASA code (written in C) is very portable although quite complex to accommodate different environments. In summary, this research demonstrated that ASA:

1. Provides a global minima in parameter space that are more certain than with regression fitting
2. Can handle very nonlinear functions and higher order models
3. Easily incorporated initial and boundary conditions
4. Can be used to verify linearization assumptions.

4. REFERENCES

1. M. A. Zeimer, et al, "Metamodel Procedures for Air Engagement Simulation Models," *IRAE Technical Report*, January 1993.

CHAPTER 3

TERSM OUTPUT-ERROR METAMODEL

1. TERSM OVERVIEW

1.1. System Representation

Following the work described in Chapter 2, we applied system identification to the TERSM metamodeling problem. TERSM (Tactical Electronic Reconnaissance Simulation Model) was designed to provide comparative performance evaluations of single and multiple-pass DF (direction-finding) systems. The output of the simulation is the number of bearing measurements made on each emitter, and the lower bound on the resulting circular error probable (CEP) of emitter locations. Inputs to the simulation include sensor parameters, an emitter environment, and aircraft parameters. The program functions as shown in Figure 3.1.1.

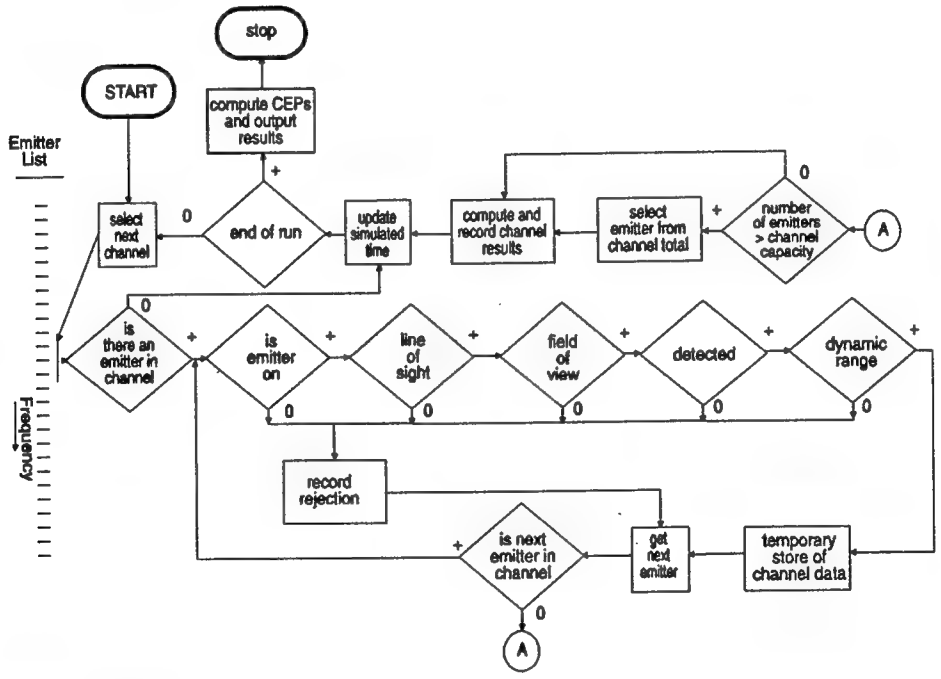

Figure 3.1.1. TERSM Functional Flow.

From this overview, you can see that the simulation is centered on the DF sensor and the operations that have to take place within the system. As a result, data generated by the simulation is event driven as a function of DF sensor processing. The update of the simulation time and corresponding motion of the aircraft platform is a function of the time required to process the data. This in turn, is a function of the number channels operating, the number of emitters detected in the channel, the frequency-scanning technique (continuous serial scanning, parallel scanning, and either serial or parallel priority scanning), and the channel capacities.

The simulation produces a lower bound on emitter location accuracy based on the assumption that the bearing errors from measurement to measurement on the same emitter are normally distributed. During the simulation, the information matrix of the probability density function is computed from the following sums:

$$I_{11} = \sum (y_i - y_e)^2 / r_i^4 \sigma$$
$$I_{12} = \sum (x_i - x_e)(y_i - y_e) / r_i^4 \sigma$$
$$I_{22} = \sum (x_i - x_e)^2 / r_i^4 \sigma$$

where σ is the standard deviation of the bearing measurement, x_i and y_i are the aircraft coordinates, x_e and y_e are the emitter coordinates, and r_i is the range at each DF measurement. At termination of the run, the covariance of the emitter location is obtained by inverting the information matrix. The covariance matrix is then diagonalized to obtain variances along the major (σ_L) and minor (σ_s) axes of the location uncertainty ellipse. The Cramer-Rao lower bound for the CEP is then computed from:

$$CEP = .674 + 0.8\left(\frac{\sigma_s}{\sigma_L}\right)^2 \qquad \text{for } \frac{\sigma_s}{\sigma_L} \le 0.5$$

or

$$CEP = .587(\sigma_s + \sigma_L) \qquad \text{for } \frac{\sigma_s}{\sigma_L} > 0.5$$

1.2. Emitter Field

The emitter field for this experiment consisted of 2359 emitters with as shown in Figure 3.1.2.. Also shown are the aircraft flight path (solid line) and the sensor field of view.

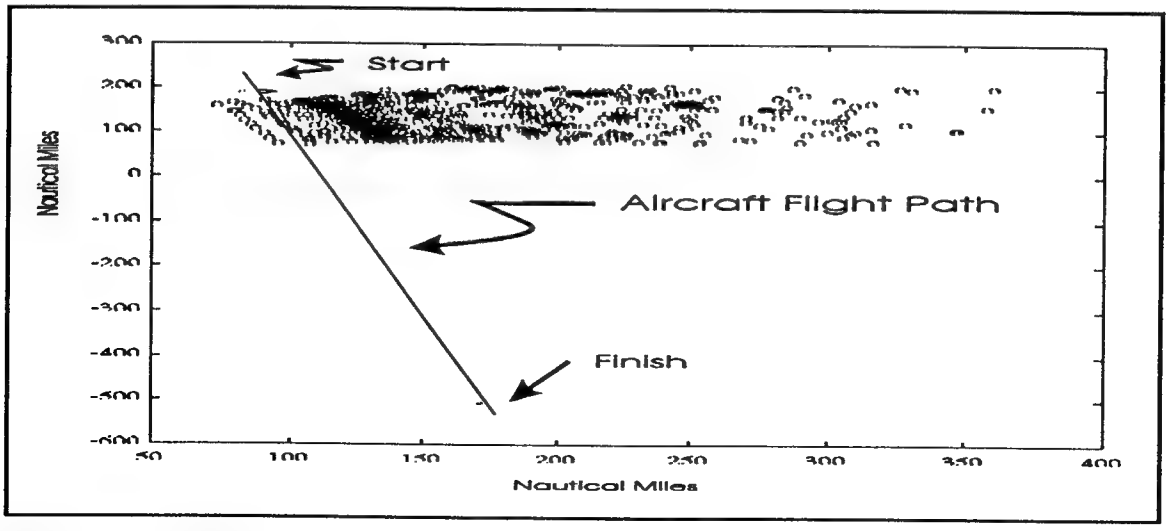

Figure 3.1.2. TERSM Emitter Field and Aircraft Path.

2. PREVIOUS WORK

Previous work with this simulation resulted in a metamodel that provided an estimate of the number of emitters found with a CEP of 5 nautical miles (nm) or less [1]. This metamodel was generated by a least squares fit of selected input data and the number of emitters reported with a CEP of 5nm or less. The inputs were aircraft altitude and velocity, azimuth coverage and channel capacity of the sensor. These inputs were combined to generate a nonlinear system with 22 inputs (up to the fourth order of a single input) to produce the square root of the number of emitters with a CEP of 5nm or less. Using a 2 layer central composite experimental design, the following model was obtained:

$$\begin{aligned}\sqrt{y} = \; & 23.567 - 0.669x_1 - 2.842x_2 + 1.298x_3 + 3.344x_4 \\ & -0.491x_1x_3 + 0.963x_1x_4 + 0.414x_2x_3 + 1.155x_2x_4 \\ & +0.231x_3x_4 + 0.404x_1x_2x_3 + 0.198x_1x_2x_4 + 0.201x_1x_3x_4 \\ & -0.285x_2x_3x_4 + 2.037x_1^2 - 0.788x_3^2 - 2.743x_4^2 + 0.714x_1^3 \\ & +5.836x_2^3 + 0.744x_3^3 - 2.947x_1^4 - 5.823x_2^4\end{aligned}$$

where

x_1 = Altitude
x_2 = Velocity
x_3 = Azimuth
x_4 = Channel Capacity

The model provided an excellent fit with an R^2 of 98.9%, maximum absolute error of 73.51 emitters, and an average absolute relative error of 4.7%. This is a good example of a metamodel that can be used to explore the effect of the different input variables on the output via surface response methodology or capability based analysis. It has not, however, identified the system simulated by TERSM. As such, it's utility for simplifying or coupling simulations, further analysis, or updating knowledge bases in expert systems is limited. Also, the domain of validity (range of the response) is not guaranteed outside of the area of the fit.

3. AN OUTPUT-ERROR METAMODEL FOR TERSM

We will pursue a different approach. Rather than combine inputs to fit the output, we will use our knowledge of the system to identify what is essentially a reduced order model. This model will concentrate on identification of the latent variables inherent to the system. Consequently, the validity of the model will not be restricted to the data used to build it.

We assume that the desired result remains the number of emitters with a CEP of less than 5nm.

Therefore we will concentrate on a metamodel that will actually compute the CEP (as opposed to other measures that may be of interest such as the probability of detection, the probability of location within 5nm, etc.).

To use this metamodel for the kind of analysis discussed above, however, we need to relate the input variables of altitude, airspeed, azimuth, and channel capacity to the latent variables used for this identification. This would require running the simulation to capture the data or another mapping from the input variables to the latent variable inputs to this metamodel.

TERSM was run simulating a single aircraft flying for 1476 seconds at 40,000 feet, 560 knots, with a sensor that could view on both the left and right. The sensor used a parallel scan over 5 bands, scanning from 60Mhz to 18GHz, with a channel capacity of 20 emitters, a 90 degree viewing angle, and a 40 degree depression. Data from this simulated flight was collected by slightly modifying (to add a few parameters) existing write statements that already existed in the simulation.

From the discussion on TERSM and analysis of the code, we see that the CEPs are functions of the relative difference between the aircraft and emitter position, and the standard deviation of the bearing noise. These parameters are used to calculate the four terms that make up the information matrix. In TERSM a running total of the information matrix is maintained for each emitter, and the lower bound of the CEP is calculated at the end of the run.

In the simulation, 949 of the 2,359 emitters were detected by the sensor. There were 12,981 DF measurements. Of these, the sequence of calculations in two cases caused the lower bound for the CEP to exceed the capability of the computer and were thus undefined. Three of the individual measurements resulted in estimates of the CEPs in excess of 5,000nm. These outliers were removed from the data resulting in 12,976 data points. (Note that in TERSM, these calculations did not pose a problem. Since, the information matrix was not inverted until the end of the run, the numerical effect of these single measurements were not observable.) In the 12,976 data points, the average lower bound for the CEP for the first half of that data points was 140nm, the average lower bound for the second half of the data was 32nm resulting in an overall average of 86nm. The maximum CEP in the data was 4,998nm, and the minimum was 1.2nm. Of the 949 emitters that were detected, 329 were located with a lower bound on the CEP of less than 5nm.

At this point, two metamodels were considered. First, a dynamical model of the simulation could have been developed that incorporated both current and past inputs and outputs in a state-space or Box-Jenkins model structure:

$$y(t) = \frac{B(q)}{F(q)}u(t) + \frac{C(q)}{D(q)}e(t)$$

Based on the physics of the situation, this would clearly be the most accurate model. In fact, given that the information matrix is a simple sum of inputs, a Markov model should be possible. To generate this metamodel, the measurement data would be collated for each of the 949 sensors (with up to 58 measurements each). Data for each sensor would be used to recursively identify an Autoregressive model that included past as well as current values of inputs and outputs. This metamodel could be used in the situation when the state of the sensor (number of measurements for a given emitter, current and past measurements, and estimates of the CEP) is known.

The second metamodel considered did not attempt to actually model the DF estimation process. This metamodel was a little more abstract and used the running total of the elements of the information matrix as inputs. In this way, the state of the sensor is fully incorporated in the input data and an output error model structure could be used:

$$y(t) = \frac{B(q)}{F(q)}u(t) + e(t)$$

The output-error structure was selected. First, it used data that was directly available from TERSM without additional processing. Second, it would be simpler to use as a module in another (larger) simulation because the state of the sensor is not required and it more closely resembles the level of abstraction in previous work. Third, the resulting model would be of significantly lower order and consequently contain fewer degrees of freedom to fit the data. Good results would be more difficult to obtain. At first this may not seem logical. But, the purpose of the research was to understand the process of metamodeling, not to metamodel a particular simulation. Errors in the process of identification are much more evident in lower order models.

3.1. Results

The first metamodel was based on the three primary inputs: the number of DF cuts available to the sensor, the range along-track, and the cross-track range. CEPs calculated with this model were not very accurate. The maximum absolute error was 4,984nm, the average error was 166nm, and average absolute relative error was 385%. Using this data, there were 719 emitters with a lower bound on the CEP of less than 5nm. Adding range as an input reduced the number of emitters found with lower bounds on the CEP less than 5nm to 670. In all of the above cases there was considerable correlation in the residual terms.

At this time, 1/range, and the combinations of ranges that were actually used to compute the information matrix, were added to the input bringing the total number of inputs to 6. While the errors for the additional inputs improved, there was still considerable structure in the residuals. Final performance, the number of emitters with a lower bound of the CEP, only improved slightly to 653 (well above the actual number of 329).

Given a known system, every projection of that system into a subspace will reduce the information content of the observed behavior. The only exception to this is the situation where the kernel of the projection coincides with the null space of the behavior.

In the usual case of inverse modeling, the structure of the system is not known. However, if the dynamics of the system are available (as in a simulation) or can be assumed, it is possible to determine the number of processes that are present in the interconnected system.

During the metamodeling (inverse modeling) process, it is imperative to model only one system. Otherwise, behaviors associated with both processes will be aliased, preventing the identification of either.

From the above discussion, it is obvious that the TERSM output is the result of two separate processes. This is an important issue. In reality, the CEP should be a piecewise continuous function of the number of measurements and the angular separation of the measurements; a single process based on the geometry of the aircraft and emitter and the statistics of individual measurements. The simulated model in TERSM, however, was a discontinuous function of the uncertainty ellipse. Since the purpose of the metamodel is to represent the simulation, two separate systems had to be modeled.

Based on the value of σ_s/σ_L, the input data was separated. Two identifications, one for each system, were accomplished. The results were immediate, the cross correlation between the output and inputs were within limits, the maximum absolute error was 387nm, the average error was .3656nm, the average absolute error was .8508nm, and the average absolute relative error was 2.9%. Using this data there were 301 emitters with a CEP lower bound less than 5nm. This metamodel was based on the (first) half of the data that had an average CEP of 140nm. The remaining data was used to determine the quality of the model.

Since the interest was in emitters with a CEP of 5nm or less, another identification was accomplished using data from the second half of the simulated run. During this portion of the profile, the sensor has more data and can provide a better estimate of the emitter location. The average lower bound for this half of the data was 32nm. Again, the residuals for each system were within limits. For this metamodel, the maximum absolute error was significantly less at 142nm. This improvement came at the cost of a slight bias with a higher average error of 1.1nm and average absolute error of 1.2nm. However, the average absolute relative error was .8%; significantly less than the metamodel based on the first half of the data.

The range of the data makes visual presentation of the results difficult. If all data points are plotted, it is not possible to determine a difference in the actual and metamodeled data. Figure 3.1.3 is a plot of the last 976 data points that had a lower bound of the CEP between 5 and 6 nm -- a range that is much less than the average of the data (32nm during this portion of the simulation). Aggregate results with this metamodel were even better, of the 329 emitters with a CEP less than 5nm, this model predicted 326.

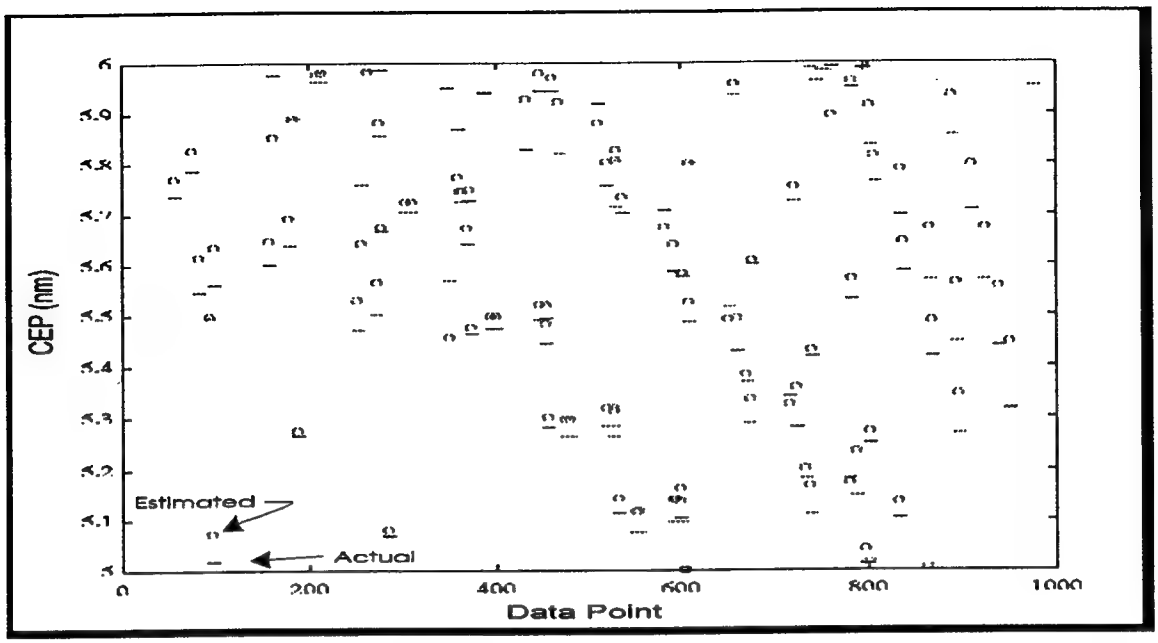

Figure 3.1.3. Actual Data and Metamodel Estimates for the Last 976 Data Points.

4. RESULTS AND CONCLUSIONS

This experiment demonstrated the framework for the application of system identification techniques to develop metamodels for tactical simulations used by the Department of Defense.

Issues identified under metamodeling combat simulations (Volume I, Chapter 3) must be explicitly addressed: nonlinearities must be built in; the experimental design must isolate the system for identification (identification of multiple independent systems results in an ill-posed problem that fails mathematically); the domain of the input must be relevant to the issues that are to be addressed by the metamodel; and finally, the accuracy of the model must be adequate to meet *a priori* requirements.

Metamodeling simulations, as opposed to data from an unknown source, provides the ability to structure the experimental design so that very accurate identification of the system or systems is possible. This knowledge also allows control over the input to the Identification algorithm so that the domain and range of the metamodel can be controlled.

In addition to meaningful results for each metamodel, the identification of system models brings with it a large library of research generated to advance the estimation and control of linear and nonlinear systems.

5. REFERENCES

1. M. A. Zeimer, et al, "Metamodel Procedures for Air Engagement Simulation Models," *IRAE Technical Report*, January 1993.

CHAPTER 4

STOCHASTIC MARKOV METAMODEL

1. INTRODUCTION

In the first three chapters of this volume, we analyzed or developed a static least squares and an output error metamodel. This chapter presents the identification of a stochastic Markov metamodel of TERSM signal processing. This development uses the Ito stochastic development from Volume I, Chapter 5, Section 5.3 and following.

For this experiment, TERSM data for two specific emitters were collected. Data from the first emitter was used to develop the metamodel while data from the second emitter was used to verify the results.

Minimization of the objective function was accomplished using Adaptive Simulated Annealing.

2. ITO STOCHASTIC MODEL

While nonlinear models for the process were evaluated, adequate results were obtained from the following linear stochastic model:

$$dx(t) = a(t)x(t)dt + g(t)d\beta(t)$$

where $d\beta(t)$ is Brownian motion of diffusion q(t). With $f[\xi,t] = a(t)\xi$, and $G[\xi,t]Q(t)G[\xi,t] = g^2(t)q(t)$ the forward Kolmogorov equation becomes:

$$\frac{\partial f_x}{\partial t} = -\left[a(t)\xi\frac{\partial f_x}{\partial \xi} + a(t)f_x\right] + \frac{1}{2}g^2(t)q(t)\frac{\partial^2 f_x}{\partial \xi^2}$$

Using the characteristic function $\phi_x(\mu,t) = \int_{-\infty}^{+\infty} e^{j\mu}f_{x(t)}(\xi)d\xi$, this equation can be reduced to the following equations for propagating the mean and covariance of $f_{x(t)}(\xi,t)$:

$$\dot{\hat{m}}_x(t) = a(t)\hat{m}_x(t)$$

$$\dot{P}_x(t) = 2a(t)P_x(t) + g^2(t)q(t)$$

In the process of optimization for a stochastic process, both the absolute error at each step and the covariance of the rate of change must be minimized. Allowing the identification of mean dynamics without constraining the variance of about mean can result in much of the fitting error being attributed to the diffusion in the process. In order to accomplish this combined optimization, a "Lagrangian" based objective function was used. The objective function for the optimization was $L = T - U$, where T represents the kinetic energy in the

error and the U is a "generalized" potential. The kinetic energy in the error "e" is proportional to de^2 combined with the covariance of the error. Therefore:

$$T = de^2 + P_x(t)$$

Because we are dealing with an Ito stochastic differential equation (to maintain the Markov property) the calculation of the change in the error, de, requires the use of the Ito differential rule of equation. Defining $e = (CEP(t_i) - x(t_i))$, use of this rule results in:

$$de(t_i) = 4dx(x(t_i) - CEP(t_i)) + g^2(t)q(t)$$

The generalized potential is directly proportional to the magnitude of the error $U = CEP(t_i) - x(t_i)$.

3. RESULTS

The resulting objective function was minimized subject to the system equation using ASA. Results are shown in Figure 4.3.1. The maximum absolute error was 15.8566nm, the average error was -2.0667nm, the average absolute error was 2.1339nm, and the average absolute relative error was 0.1973%. Run time for the search was 2 minutes, 11 seconds.

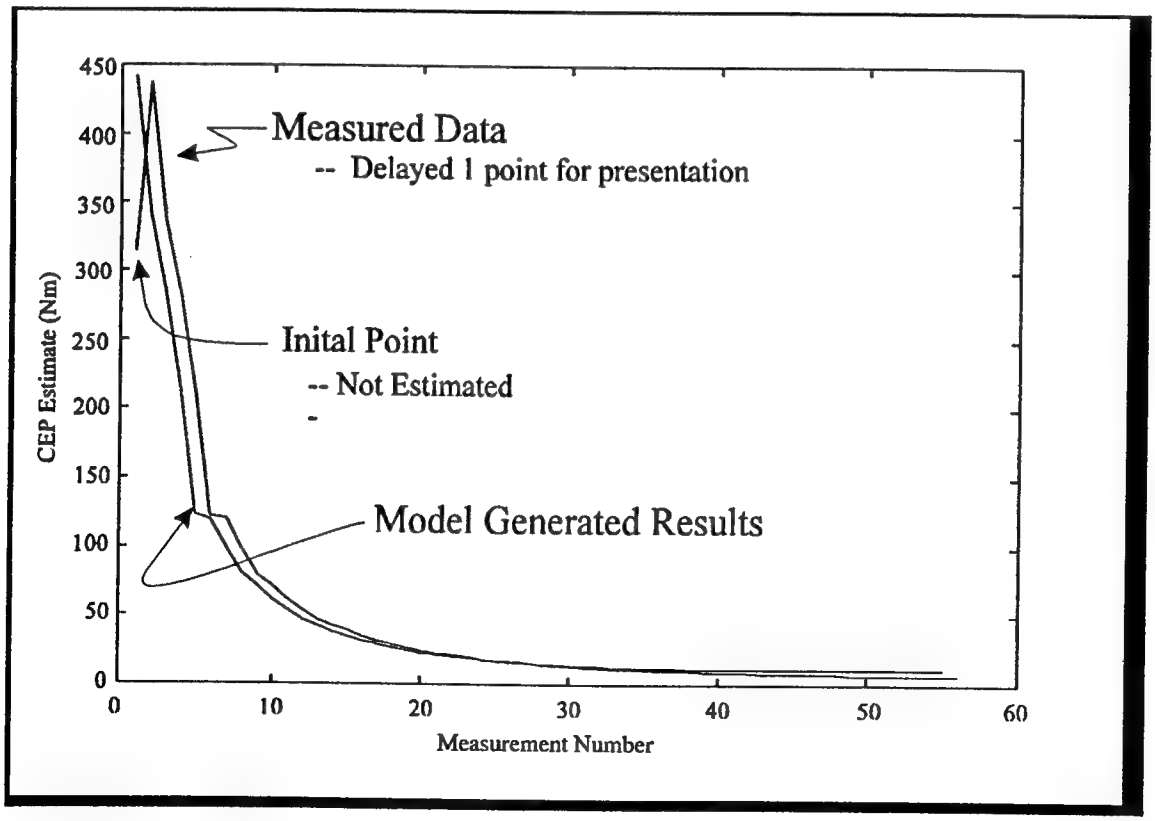

Figure 4.3.1. Comparison of Actual and Modeled Data.

Additional experimentation with the objective function demonstrated a surprising degree of flexibility. If only the final error was penalized, the estimation error slowly converged to zero at the last measurement. A quicker response (at the same order) resulted in an underdamped system with multiple overshoots.

4. CONCLUSIONS

This demonstration illustrated the feasibility of using Ito stochastic metamodels to accurately represent complex behaviors. For stochastic systems, both the absolute error at each step and the covariance of the rate of change must be minimized. Differentiation must be accomplished using the Ito differential rule.

Initialized properly, Adaptive Simulated Annealing provides a method of identifying systems modeled with stochastic differential equations. The ease of use (after the learning curve) combined with the fact that a global minimum is statistically guaranteed, makes this an excellent technique for identification of complex, linear or nonlinear, deterministic or stochastic systems. ASA is also a good selection to verify or improve upon less robust optimization procedures.

CHAPTER 5

SIMTAX FEATURE SPACE AND RESULTS

1. INTRODUCTION

1.1. Chapter Summary

This chapter presents the results of an analysis of 162 Combat Simulations selected from the *Catalog of Wargamming and Military Simulation Models, 11th Edition*, compiled by the Force Structure, Resource, and Assignment Directorate (J-8) [1]. The analysis was accomplished to identify significant characteristics and group the types of problems facing the Air Force Analyst and Engineer. This analysis used the metamodeling feature space defined in Chapter 5, Air Force Metamodeling Problems.

1.2. Scope

This analysis supported the objective of defining classes of Air Force metamodeling problems based on the simulations. Table 5.1.1. presents the simulation categories and subcategorizes that were entered into the "SIMTAX" database used for this research. All of the simulations tabulated under each heading were entered.

Table 5.1.1. Catalog categories selected for SIMTAX.

CATEGORY	SUBCATEGORY
COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE (less strategic systems)	
CONFLICT OTHER THAN STRATEGIC NUCLEAR	**AWACS** **Air Base Attack/Tactical Support** **Air Combat - Many on Many** **Air Combat - One on One** **Air Defense** **Air Forces Only** **Air/Ground - Conventional Conflict** **Reconnaissance**
ELECTRONIC WARFARE	
INTELLIGENCE	
WEAPONS SYSTEMS SIMULATIONS	**Air Systems Fixed Wing** **Ground Systems** **Special Systems**

1.3. Overview

The simulations in the above categories were entered into a Paradox database that had fields corresponding to the feature space. This database was called SIMTAX.DB. Since a simulation could have multiple entries for any particular field that corresponded with different setup options, SIMTAX.DB had a separate entry for each of the possible capabilities. This database is included as Appendix A.

Another database was developed for each field of SIMTAX.DB that contained the approved abbreviation for the entry and a unique binary vector that was identified with this particular entry. The feature vector was generated through a query that generated as the output, the catalog, simulation category and subcategory, simulation name, and the feature vector of the simulation.

The output of the query, another database table, was exported to an ASCII flat file that was tab delimited. This file was read by a MATLAB M-file that converted the ASCII file to the MATLAB matrix format.

Once in the MATLAB format, the separate catalog entries for each simulation were converted from strings to numbers (where appropriate), and combined so that there was one feature vector for each simulation. Then the simulations were grouped by category and subcategory defining the number of entered categories and the number in each category.

For each of the separate categories, each bit in the feature vector was evaluated to determine the relative frequency of occurrence, the variation, and the range of the bit values (this should be zero or 1). From this data, the most likely value for each bit was computed and combined into a "characteristic" vector for the category.

Now that a characteristic vector was defined for each category, this vector was used as the centroid of a cluster for the category and the distance from each simulation to all of the characteristic vectors (one defined for each category) was determined and sorted by distance for the center of the category of which it was a member..

2. DATABASES USED TO SUPPORT THE BUILDING OF THE FEATURE VECTOR

2.1. Introduction

This section provides the structure of all database tables, and the entries for the field databases that generated the feature vector. These tables follow Chapter 5 with a single exception. In development of this vector, selections from "analytical" and "training and education" were combined into a single table defining the model type.

The SIMTAX database was organized as follows (all fields were alphanumeric):

Table 5.2.1. SIMTAX Database Structure.

FIELD	NAME	SIZE
1	Catalog	75
2	Category	100
3	Type	100
4	Simulation	10
5	Model Type	100
6	Domain	15
7	Span	15
8	Environment	25
9	Force Composition	15
10	Scope of Conflict	20
11	Mission Area	20
12	Level of Detail	20
13	Construction	45
14	Time Processing	20
15	Treatment of Randomness	65
16	Sidedness	45
17	Input	80
18	Output	80

The mission area, level of detail, input, and output fields were not used for this analysis. All of the remaining fields were coupled to the feature vector as depicted in the following tables:

Table 5.2.2. Model Type Database

ABBR	DESCRIPTION	VECTOR
A	Analysis	1 0 0 0 0 0 0 0 0 0 0
A-OST	Analysis, operation support tool (decision aid)	0 1 0 0 0 0 0 0 0 0 0
A-RE	Analysis, research and evaluation (R&E) tool	0 0 1 0 0 0 0 0 0 0 0
A-RE-CD	Analysis, (R&E) tool - combat development	0 0 0 1 0 0 0 0 0 0 0
A-RE-FCR	Analysis,(R&E) tool - force capability and reqmnts	0 0 0 0 1 0 0 0 0 0 0
A-RE-WS	Analysis, (R&E) tool dealing with weapon systems	0 0 0 0 0 1 0 0 0 0 0
EDU	Education	0 0 0 0 0 0 1 0 0 0 0
T/E	Training and education	0 0 0 0 0 0 0 1 0 0 0
T/E-ED	Training and education, exercise driver	0 0 0 0 0 0 0 0 1 0 0
T/E-SD	Training and education, skills development	0 0 0 0 0 0 0 0 0 1 0
TR	Training	0 0 0 0 0 0 0 0 0 0 1
N/A	Not Applicable	0 0 0 0 0 0 0 0 0 0 0

Table 5.2.3. Domain Database.

ABBREVIATION	DESCRIPTION	VECTOR
A	Air	1 0 0 0 0 0 0 0 0 0
AB	Airbase	0 1 0 0 0 0 0 0 0 0
ABS	Abstract	0 0 1 0 0 0 0 0 0 0
CO	Coast	0 0 0 1 0 0 0 0 0 0
L	Land	0 0 0 0 1 0 0 0 0 0
N	Naval	0 0 0 0 0 1 0 0 0 0
POL	Politics	0 0 0 0 0 0 1 0 0 0
S	Sea	0 0 0 0 0 0 0 1 0 0
SP	Space	0 0 0 0 0 0 0 0 1 0
US	Undersea	0 0 0 0 0 0 0 0 0 1
N/A	Not Applicable	0 0 0 0 0 0 0 0 0 0

Table 5.2.4. Span Database.

ABBREVIATION	DESCRIPTION	VECTOR
GEO	Geographic area	1 0 0 0 0 0 0 0 0
GLOB	Global	0 1 0 0 0 0 0 0 0
IND	Individual	0 0 1 0 0 0 0 0 0
INTER	Intertheater	0 0 0 1 0 0 0 0 0
INTRA	Intratheater	0 0 0 0 1 0 0 0 0
LOC	Local	0 0 0 0 0 1 0 0 0
REG	Regional	0 0 0 0 0 0 1 0 0
SECT	Sector	0 0 0 0 0 0 0 1 0
TH	Theater	0 0 0 0 0 0 0 0 1
N/A	Not Applicable	0 0 0 0 0 0 0 0 0

Table 5.2.5. Environment Database.

ABBR	DESC	VECTOR
A	Air	1000000000000000000000000000000000
BAR	Barrier	0100000000000000000000000000000000
BAT	Battlefield	0010000000000000000000000000000000
CAN	Canalization	0001000000000000000000000000000000
CF	Cultural features	0000100000000000000000000000000000
COM	Communications	0000010000000000000000000000000000
DES	Deserts	0000001000000000000000000000000000
D/N	Day and night	0000000100000000000000000000000000
DT	Digitized terrain	0000000010000000000000000000000000
EAR	Earth	0000000001000000000000000000000000
EW	Elect. Warfare	0000000000100000000000000000000000
FOR	Forestation	0000000000010000000000000000000000
GEO	Geography	0000000000001000000000000000000000
HEX	Hex-based	0000000000000100000000000000000000
JU	Jungles	0000000000000010000000000000000000
L	Land	0000000000000001000000000000000000
MET	Met conditions	0000000000000000100000000000000000
S	Sea	0000000000000000010000000000000000
SEAS	Seasons	0000000000000000001000000000000000
SP	Space	0000000000000000000100000000000000
SS	Sea States	0000000000000000000010000000000000
S/S	Sunrise & sunset	0000000000000000000001000000000000
TD	Time of day	0000000000000000000000100000000000
TEMP	Temperature	0000000000000000000000010000000000
TER	Terrain	0000000000000000000000001000000000
TF	Trans factors	0000000000000000000000000100000000
TRAF	Trafficability	0000000000000000000000000010000000
URB	Urban	0000000000000000000000000001000000
UW	Underwater	0000000000000000000000000000100000
VEG	Vegetation	0000000000000000000000000000010000
W	Weather	0000000000000000000000000000001000
N/A	Not Applicable	0000000000000000000000000000000100

Table 5.2.6. Force Composition Database.

ABBREVIATION	DESCRIPTION	VECTOR
AB	Airbase	1000000
COMB	Combined	0100000
CONC	Conceptual	0010000
COMP	Component	0001000
CORPS	Corps	0000100
ELEM	Element	0000010
JF	Joint	0000001
N/A	Not Applicable	0000000

Table 5.2.7. Scope of Conflict Database.

ABBREVIATION	DESCRIPTION	VECTOR
BIO	Biological	1000000000000000
CH	Chemical	0100000000000000
CONV	Conventional	0010000000000000
DET	Detection	0001000000000000
ELEC	Elec. combat/warfare	0000100000000000
KIN	Kinetic	0000010000000000
LAS	Laser	0000001000000000
MIN	Mines	0000000100000000
NONSTR	Nonstrategic	0000000010000000
NUC	Nuclear	0000000001000000
POL	Political	0000000000100000
RA	Rear area	0000000000010000
SPEC	Special	0000000000001000
STRAT	Strategic	0000000000000100
UNC	Unconventional	0000000000000010
VER	Verification	0000000000000001
N/A	Not Applicable	0000000000000000

Table 5.2.8. Time Processing Database

ABBREVIATION	DESCRIPTION	VECTOR
DYN	Dynamic	100000
DYN-CF	Dynamic, closed form	010000
DYN-ES	Dynamic, event-step	001000
DYN-TS	Dynamic, time-step	000100
STATIC	Static	000010
STATIS	Statistical	000001
N/A	Not Applicable	000000

Table 5.2.9. Human Participation Database.

ABBR	DESCRIPTION	VECTOR
NP	Not permitted	1000000000000000
NR	Not required	0100000000000000
NR-INT	Not required, model interruptable	0010000000000000
NR-SC	Not required, scheduled changes	0001000000000000
REQ	Required	0000100000000000
REQ-A	Required for analysis	0000010000000000
REQ-D	Required for decisions	0000001000000000
REQ-P	Required for processes	0000000100000000
REQ-DP	Required for decisions & processes	0000000010000000
REQ-GR	Required for graphics	0000000001000000
REQ-I	Required for input	0000000000100000
REQ-ID	Required for interactive decisions	0000000000010000
REQ-SU	Required for setup	0000000000001000
U-I	User-interactive	0000000000000100
N/A	Not Applicable	0000000000000010

Table 5.2.10. Treatment of Randomness Database.

ABBREVIATION	DESCRIPTION	VECTOR
DET	Deterministic	10000
DET-EV	Deterministic, function of expected value	01000
STO	Stochastic	00100
STO-DC	Stochastic, direct computation	00010
STO-MC	Stochastic, Monte Carlo	00001
N/A	Not Applicable	00000

Table 5.2.11. Sidedness Database.

ABBREVIATION	DESCRIPTION	VECTOR
1	One-sided	100000000
1NR	One side nonreactive (same for reactive)	010000000
2	Two-sided	001000000
3	Three-sided	000100000
A	Asymmetric	000010000
NR	Nonreactive	000001000
R	Reactive	000000100
RED-NR	RED side nonreactive (same for BLUE)	000000010
S	Symmetric	000000001
N/A	Not Applicable	000000000

3. DATABASE QUERRY AND STRUCTURE

The structure of the query is important because it defines the output and the order of the output vectors. Subsequent components that function on the output must insure that the structure is as expected. The structure of this query is shown in Figure 5.3.1.

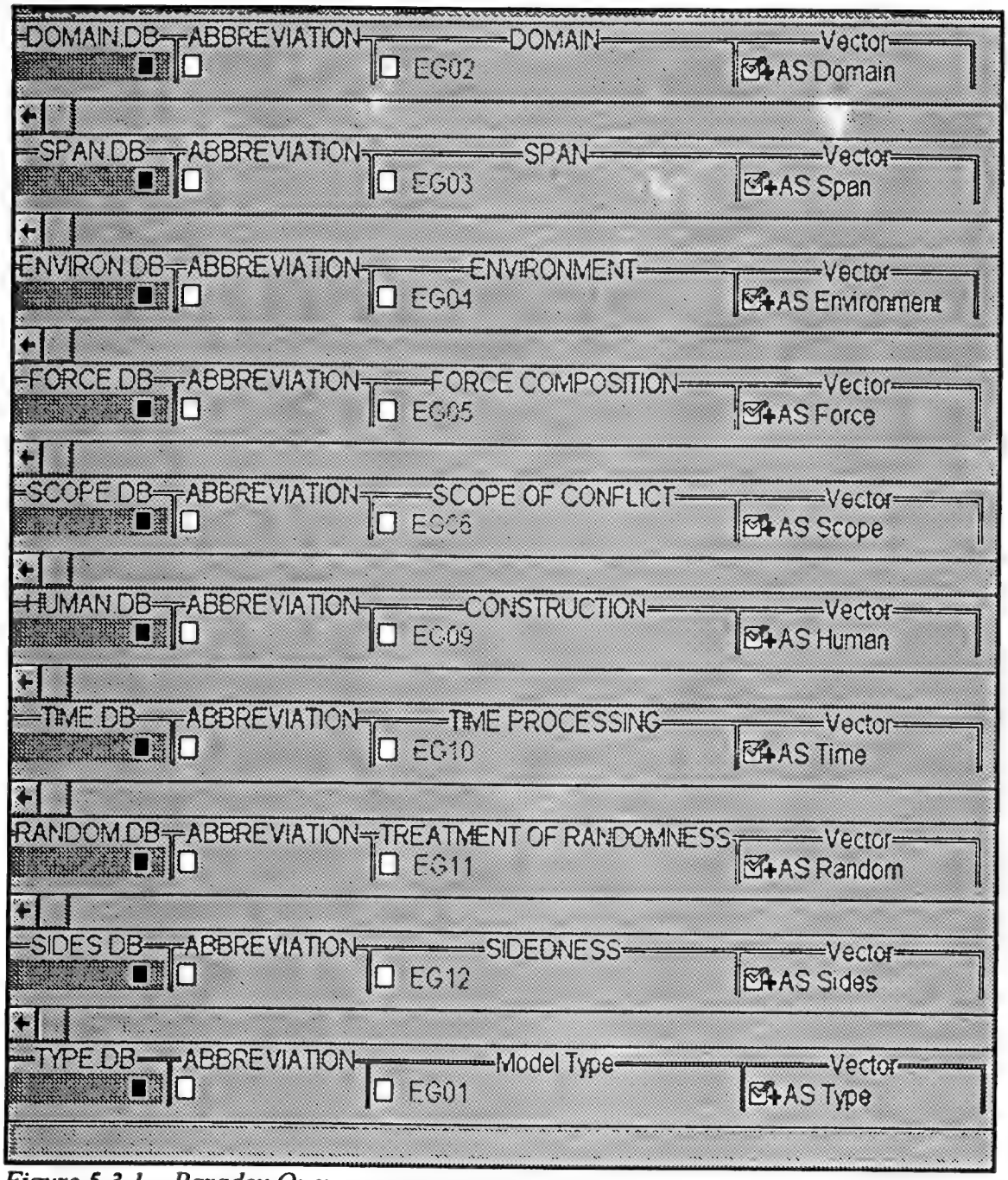

Figure 5.3.1. Paradox Query.

4. METAMODELING FEATURE VECTOR

The output of the above query, another database table, was exported to an ASCII flat file that was tab delimited. An example of the ASCII file follows:

```
J-8 Models Catalog 11th Edition  CONFLICT OTHER THAN STRATEGIC NUCLEAR
    Air Combat - Many on Many  AASPEM  0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1
0 0 0 0 0 0 0
```

This file was read by a MATLAB M-file that converted the ASCII file to the MATLAB matrix format.

Once in the MATLAB format, the separate catalog entries for each simulation were converted from strings to numbers (where appropriate), and combined so that there was one feature vector for each simulation. Then the simulations were grouped by category and subcategory defining the number of entered categories (15) and the number in each category.

For each of the separate categories, each bit in the feature vector was evaluated to determine the relative frequency of occurrence, the variation, and the range of the bit values (this should be zero or 1). From this data, the most likely value for each bit was computed and combined into a "characteristic" vector for the category.

5. METAMODELING CLASSES

Once the feature space that encompasses the selected metamodeling problems is defined, the next step is to determine classes of metamodeling problems. This is accomplished by evaluating the density of the metamodeling problems in the feature space and, based on the characteristics of the space, selecting criteria for clustering. Classes of simulations are then defined by these clusters.

The classification of simulations defined in this manner requires clustering via nonparametric techniques. In this case the selection of the "metric" is critical [2].

5.1. Metric Spaces

A metric space is a pair of objects, a set X and a metric, or distance function, d. The metric d(x,y) is a real valued function satisfying the following axioms [3]:

$$d(x,y) > 0 \quad d(x,x) = 0 \;\; \forall\, x,y \in X$$

$$if \;\; d(x,y) = 0 \;\; ==> \;\; x = y \;\; \forall\, x,y \in X$$

$$d(x,y) = d(y,x) \;\; \forall\, x,y \in X$$

$$d(x,y) \le d(x,z) + d(z,y) \forall\, x,y \in X$$

For the type of information we are trying to extract from the feature vector, we can define the following metric:

Let X(n) is the set of all ordered n-tuples of "zeros" and "ones." For example:

$$X(2)=\{00,01,10,11\}$$

Let $d(x,y)$ = the number of places where x and y have different entries. Then $(X(n),d)$ is a metric space that satisfies the above axioms.

5.2. Nonparametric clustering techniques

If the clusters are separated, even if they are a different diameter, **separating hyperplanes** (decision surfaces) can be defined that associate a measurement with a cluster. This technique will not work with overlapping clusters. The **K-nearest neighbor** technique should be used for overlapping clusters that are equally likely. In this case, the number of points in the cluster define a priori status probability of occurrence.

The **nearest prototype** technique will provide the nearest centroid regardless of the dispersion. Each class/aspect combination is represented by a cluster centroid, and each element is assigned to the cluster with the shortest measurement-to-prototype distance.

Classification by any of these clustering techniques will not provide an indication of the confidence of the choice.

5.3. Binary Vector Space Analysis

An analysis of the total binary vector space (cardinality = 162, dimension = 125) where D_{ij} is the difference between feature vectors showed that:

$$\min_{i,j\in N}(D_{ij})=1 \qquad i\neq j$$

and therefore, no two simulations are the same and $(X(n),d)$ is a valid metric space (computed by $\min(Y(2,:))$ in sortbyd.m). Also:

1. The maximum distance between any two simulations $\left(\max_{i,j\in N}(D_{ij})\right)$ was 34. (Computed by $\max(Y(n,:))$ in sortbyd.m).
2. The maximum value $\left(\max_{j\in N}\left(\min_{i\in N}(D_{ij})\right)\right)$ of the minimum separation between any two simulations was 20. (Computed by $\max(Y(2,:))$ in sortbyd.m).
3. The average closest distance between all simulations is 7.44
4. The standard deviation of the closest distance is 3.64

Further use of difference between feature vectors (D_{ij}) to develop clusters of simulations is being investigated. Since this measure primarily provides a direct indication of the complexity of the simulation, clusters based on the distance may provide useful groups for defining metamodel structures.

Recall that a characteristic vector was defined for each category. This vector was used as the centroid of a cluster for the category and the distance from each simulation to all of the characteristic vectors (one defined for each category) was determined and sorted by distance for the center of the category of which it was a member. Figure 5.5.1 is a plot of the distance of the simulations from it's cluster center.

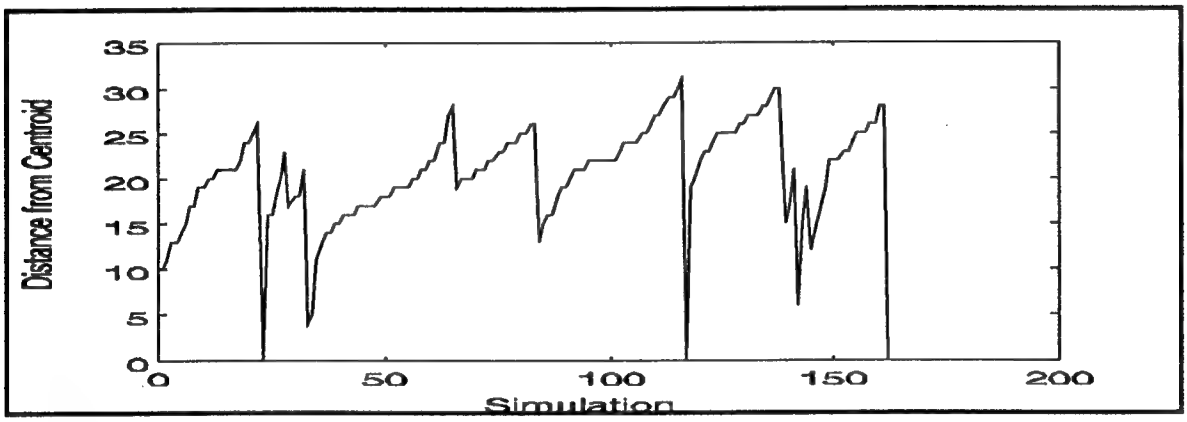

Figure 5.5.1. Sorted distance from the Cluster Centroid.

From this plot (and the data) we see that there are three clusters with a single simulation, and that there are six additional clusters with less that five simulations. These eight clusters should eventually be consolidated with the seven larger clusters.

Figure 5.5.2 is a plot of the distance of all of the simulations from the centroid of the first category. This plot shows that many of the simulations not in the cluster are within its boundary and that the clusters require further refinement.

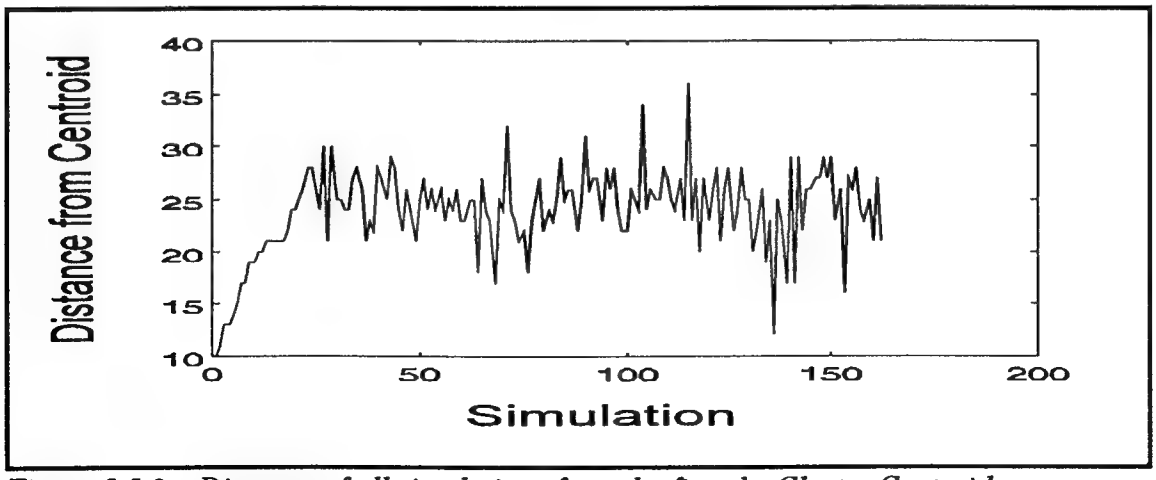

Figure 5.5.2. Distance of all simulations from the first the Cluster Centroid.

A final graphic displays the same type of information shown in Figure 5.5.2 for simulations and all categories.

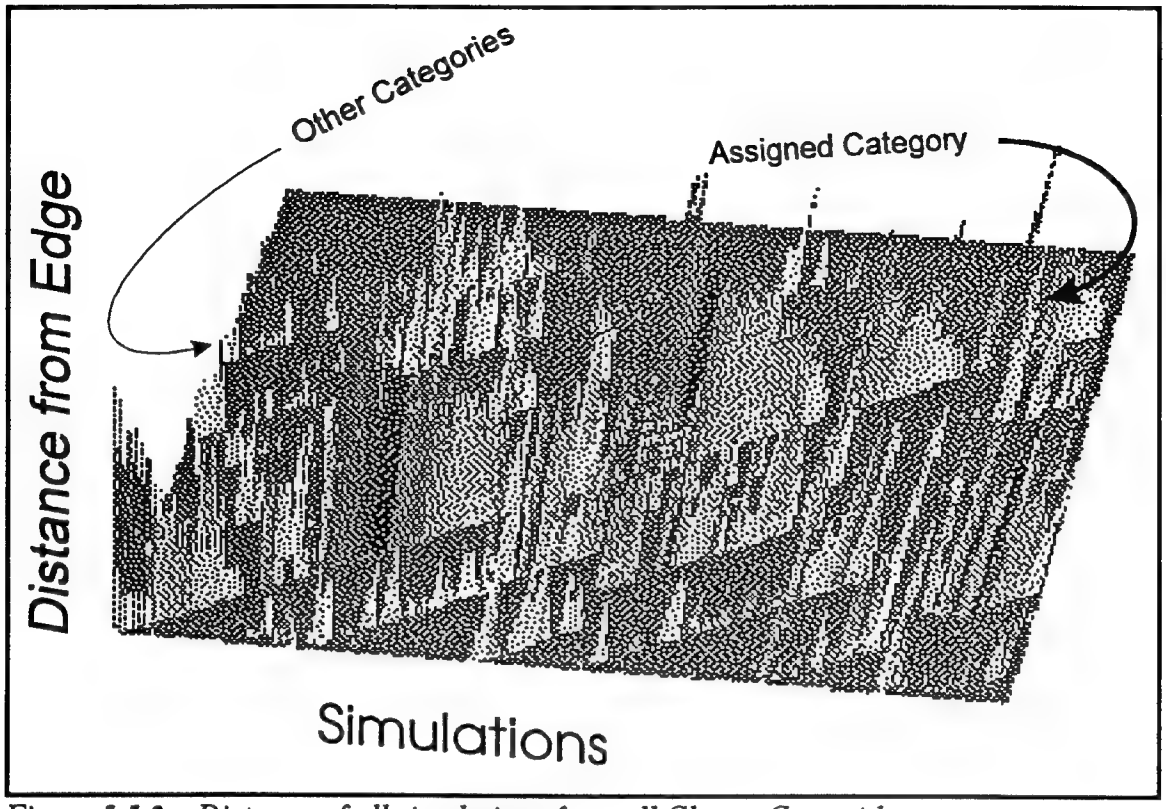

Figure 5.5.2. Distance of all simulations from all Cluster Centroids.

6. REFERENCES

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CHAPTER 6

MODEL ORDER SELECTION

1.1 INTRODUCTION

This Chapter presents the results of experiments to determine model order using the generalized (method independent) technique of Canonical Correlation Analysis.

1.2 MODEL ORDER SELECTION USING CANONICAL VARIATE ANALYSIS

1.2.1 Canonical Representations

Given a set X and an equivalence relation[1], denoted ~, on that set, we can decompose the set into subsets each composed of elements that are equivalent to each other. This decomposition results in a quotient set of subsets of X. Given a set X and an equivalence relation ~, a subset C of X will be a set of canonical forms for X under ~ if for every $x \in X$ there exists one and only one $c \in C$ such that $x \sim c$ [1].

Our canonical representation will consist of the first maximum set of independent elements within the sequence of predictors [2]. For linear systems, orthogonality was sufficient to insure independence. For nonlinear systems, stochastic independence is required [3]. Analysis of a set of canonical variates can be used to trade off the bias due to low order model versus the additional variability introduced by too high an order. This analysis is concerned with the canonical representation of the correlation between two sets of random variables [2,4].

1.2.2 Problem Statement

The CVA technique for model order determination was used to estimate the order of the Lorenz attractor with process excitation noise. The Lorenz attractor is a Markov process with the following state equations:

$$\dot{x}_1 = \sigma(x_2 - x_1)$$
$$\dot{x}_2 = -\rho x_1 - x_2 - x_1 x_3$$
$$\dot{x}_3 = -\beta x_3 + x_1 x_2$$

In the simulation, $\sigma = 10$, $\rho = 28$, $\beta = 8/3$, which results in Chaotic behavior. The differential equations were discretized with $\Delta t = .01$. White process excitation noise with a covariance of $\eta = I \times 10^{-4}$ was added as shown below:

$$x_1(t+1) = x_1(t) + \Delta t\sigma(x_2(t) - x_1(t)) + \eta_1$$
$$x_2(t+1) = x_2(t) - \Delta t[\rho x_1(t) - x_2(t) - x_1(t)x_3(t)] + \eta_2$$
$$x_3(t+1) = x_3(t) - \Delta t[\beta x_3(t) + x_1(t)x_2(t)] + \eta_3$$

---

[1]The properties of an euivalence relation are: Transitivity, Symmetry, and Reflexivity

Figures 6.2.1 through 6.2.3 present the phase plane outputs of the Lorenz attractor. The data used to determine the order consisted of measurements of the first state which is shown in Figure 6.2.4.

1.2.3 CVA Setup

CVA requires that the data be separated into past and future vectors. The Hilbert space that defined the past data was approximated by a polynomial of up to degree three in the past three lags.

$$p(t) = f_{i_1,i_2,i_3}\left(x_1(t-1), x_1(t-2), x_1(t-3)\right) = (x_1(t-1))^{i_1}(x_1(t-2))^{i_2}(x_1(t-3))^{i_3}$$

for $i_1 + i_2 + i_3 \le 3$.

A computer routine was developed to generate the input polynomials.. They were build sequentially by degree, by variable sequence, and by then set. Given 3 input terms (lags of the input variable) input polynomials are built as shown below:

By Degree	P1	P2	P3	=> degree = 1		
By Seq	P1P1	P1P2	P1P3	=> degree = 2 /	variable 1	
	P2P2	P2P3		=>	variable 2	
	P3P3			=>	variable 3	
By Set	P1P1P1	P1P1P2	P1P1P3	=> degree = 3 / variable 1 /		set P1P1
	P1P2P2	P1P2P3		=>		set P1P2
	P1P3P3			=>		set P1P3
	P2P2P2	P2P2P3		=>	/ variable 2 /	set P2P2
	P2P3P3			=>		set P2P3
	P3P3P3			=>	/ variable 3 /	set P3P3

The routine functioned by determining the repeated sequences and the first term in the sequence that made up the next series of terms. The routine was manually verified up to 4 variables to degree 6 (210 terms) and 5 variables to the 5th degree (252 terms). The routine generates the proper number of terms for 4 variables up to degree 4 (46376 terms).

There are 20 such input terms each set of three lags. Consequently, any $x_1(t)$ can affect up to 20 terms in the future and the future vector consists of:

$$f(t) = \left(x_1(t), x_1(t+2), \cdots, x_1(t+20)\right)$$

Data from the Lorenz attractor, Figure 6.2.4 was parsed into past and future terms. Input and output vectors were defined, beginning at $t = 4$, by the past three lags (which generate 20 terms) and 19 additional future outputs. Time was incremented until there were insufficient future variables to construct an input and output.

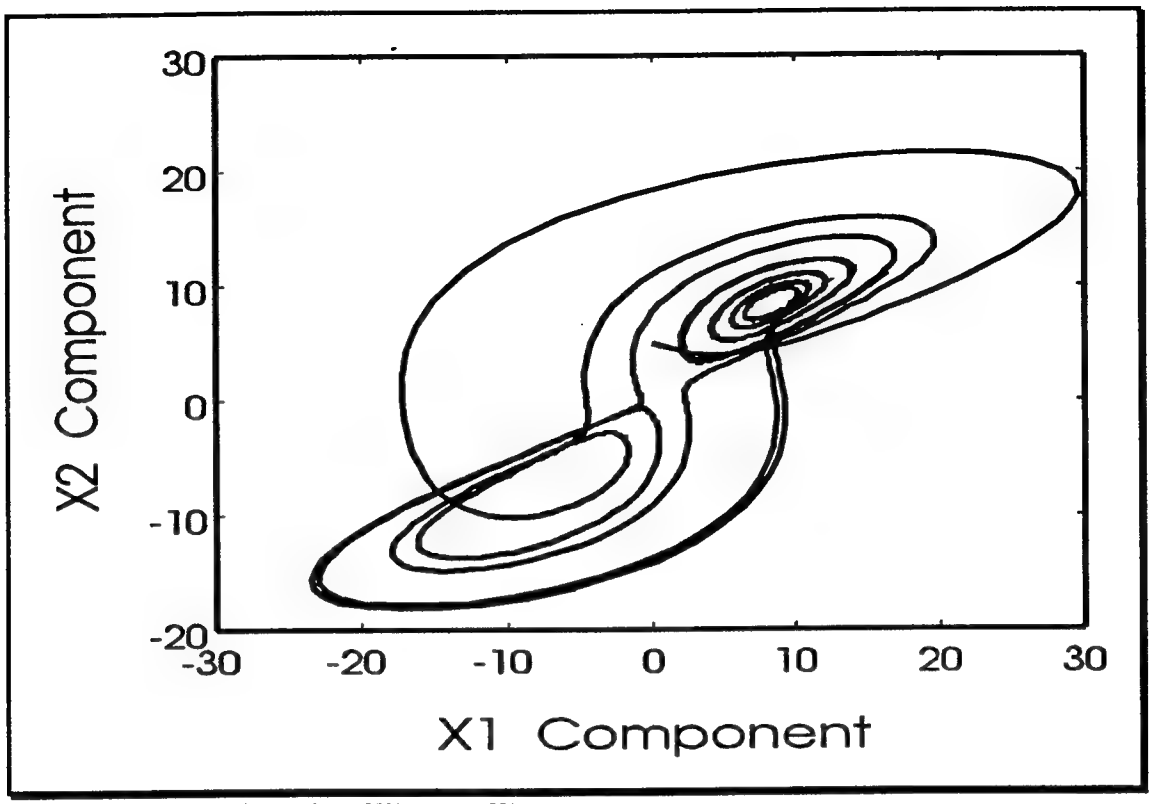

Figure 6.2.1 Phase Plane Plot of X2 versus X1.

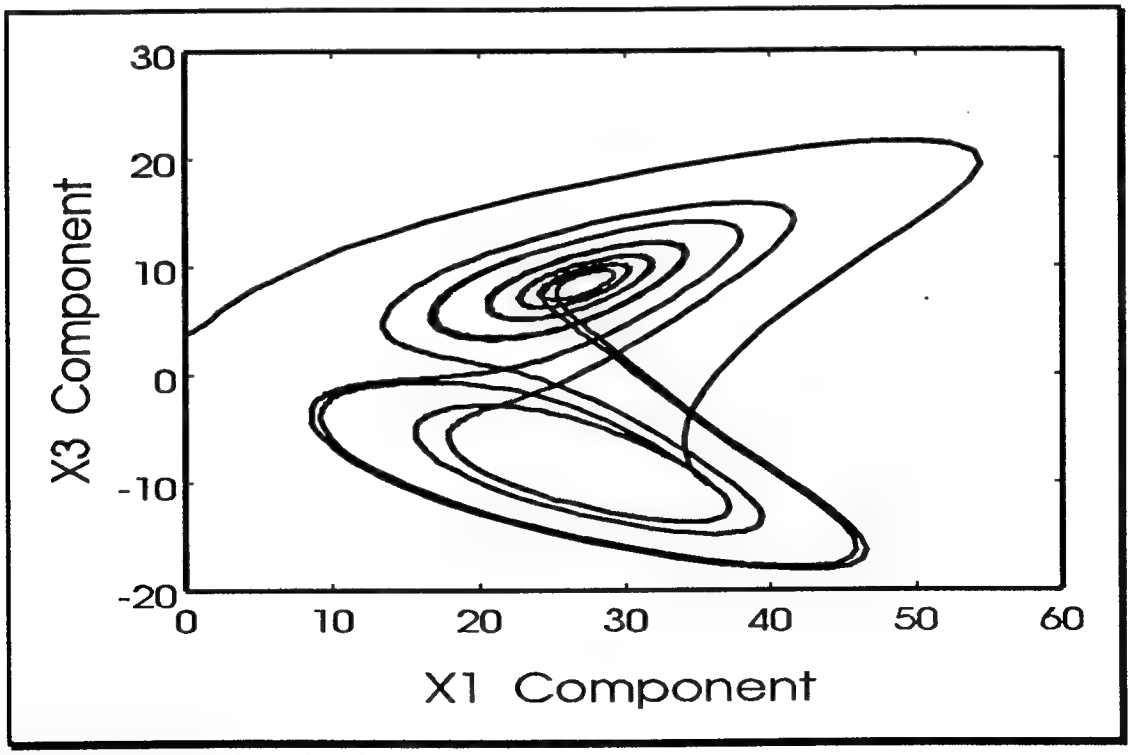

Figure 6.2.2 Phase Plane Plot of X3 versus X1.

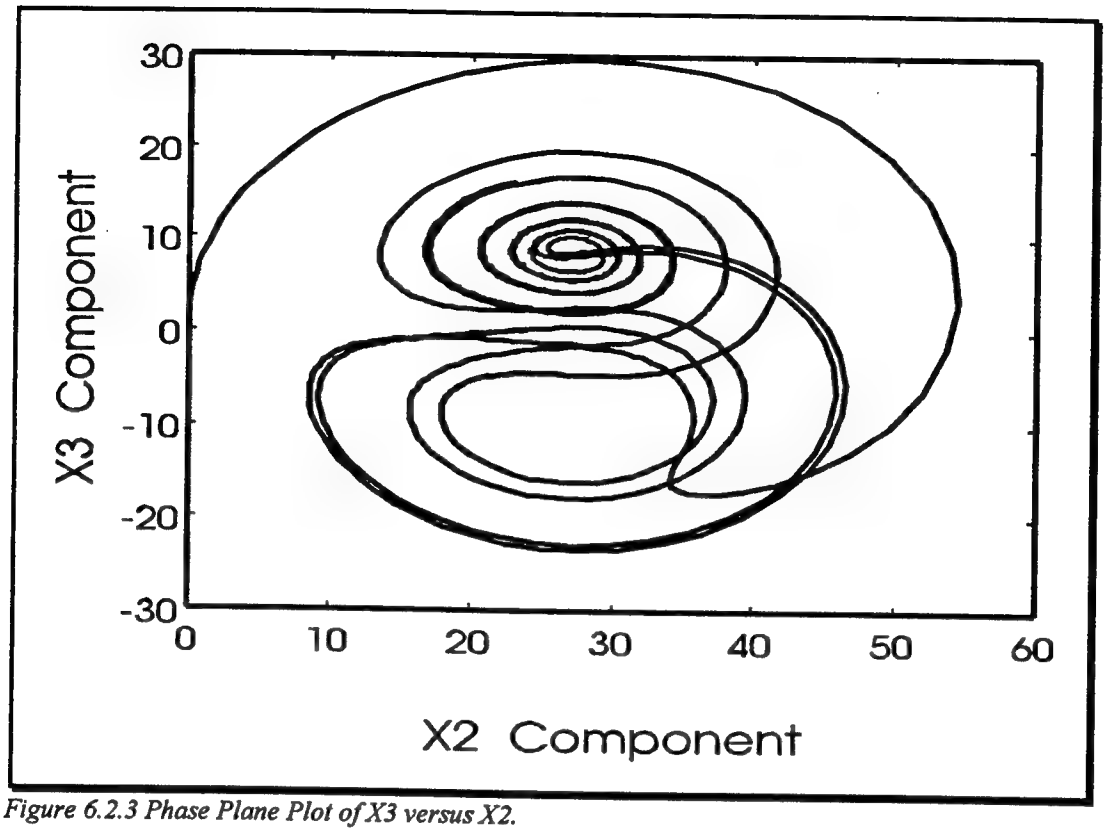

Figure 6.2.3 Phase Plane Plot of X3 versus X2.

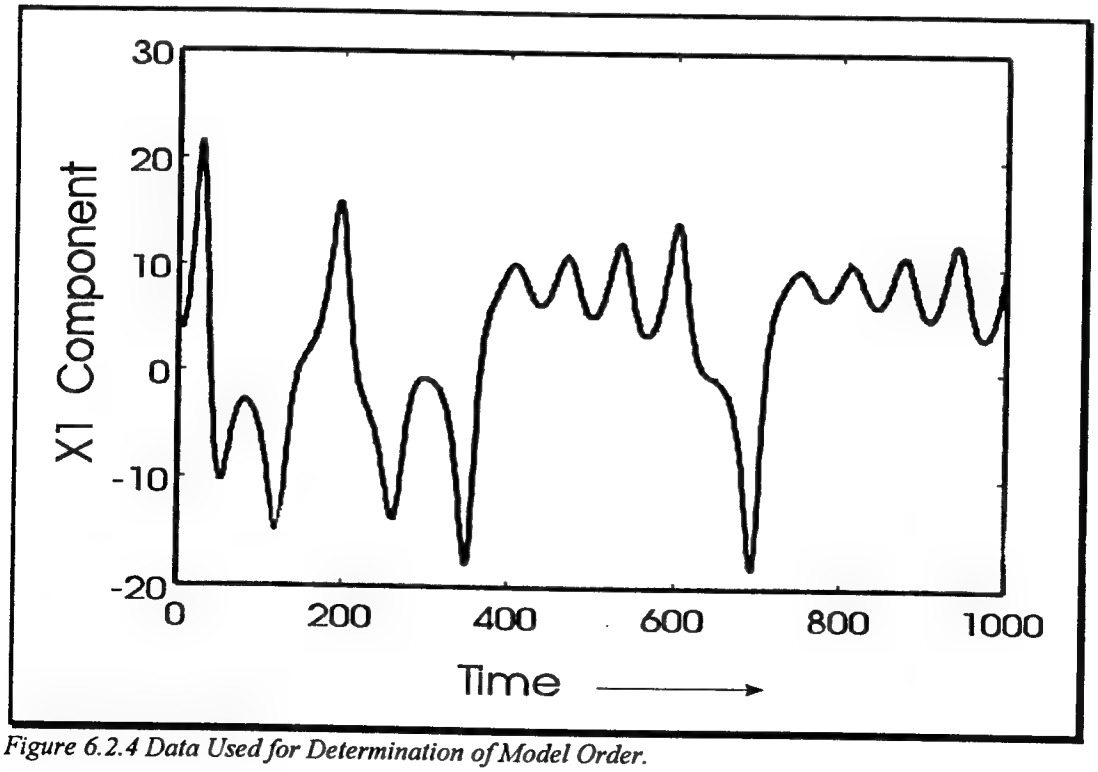

Figure 6.2.4 Data Used for Determination of Model Order.

1.2.4 Stochastically Independent CVA Results

The CVA algorithm described in Volume 1, Chapter 6 was used to determine the order of the system. This algorithm implements the Alternate Conditional Expectation (ACE) algorithm to generate the maximal correlation between the input and output function of the data. This resulted in stochastically independent inputs suitable for nonlinear systems. Table 6.2.1 is a comparison of the correlations for the stochastically independent results with previous work that used CVA with sequential selection of orthogonal input variables (optimal inputs for linear systems). Figure 6.2.5 is a plot of this comparison.

CANONICAL VARIATE	ORTHOGONAL INDEPENDENT VARIABLES	STOCHASTIC INDEPENDENT VARIABLES
1	0.9999	0.9999
2	0.9746	0.9981
3	0.9043	0.9921
4	0.6062	0.9165
5	0.3022	0.4155
6	0.1782	0.2953
7	0.1626	0.0433
8	0.1539	0.0100
9	0.1309	0.0012
10	0.0969	0.00007
11	0.0940	0.00001
12	0.0827	0.0000033
13	0.0686	0.0000010
14	0.0581	0.0000000924079
15	0.0461	0.0000000073800
16	0.0149	0.0000000040007
17	0.0102	0.0000000013386
18	0.0041	0.0000000000004
19	0.0011	

Table 6.2.1 Comparison of Correlations for Orthogonal and Stochastically Independent CVA.

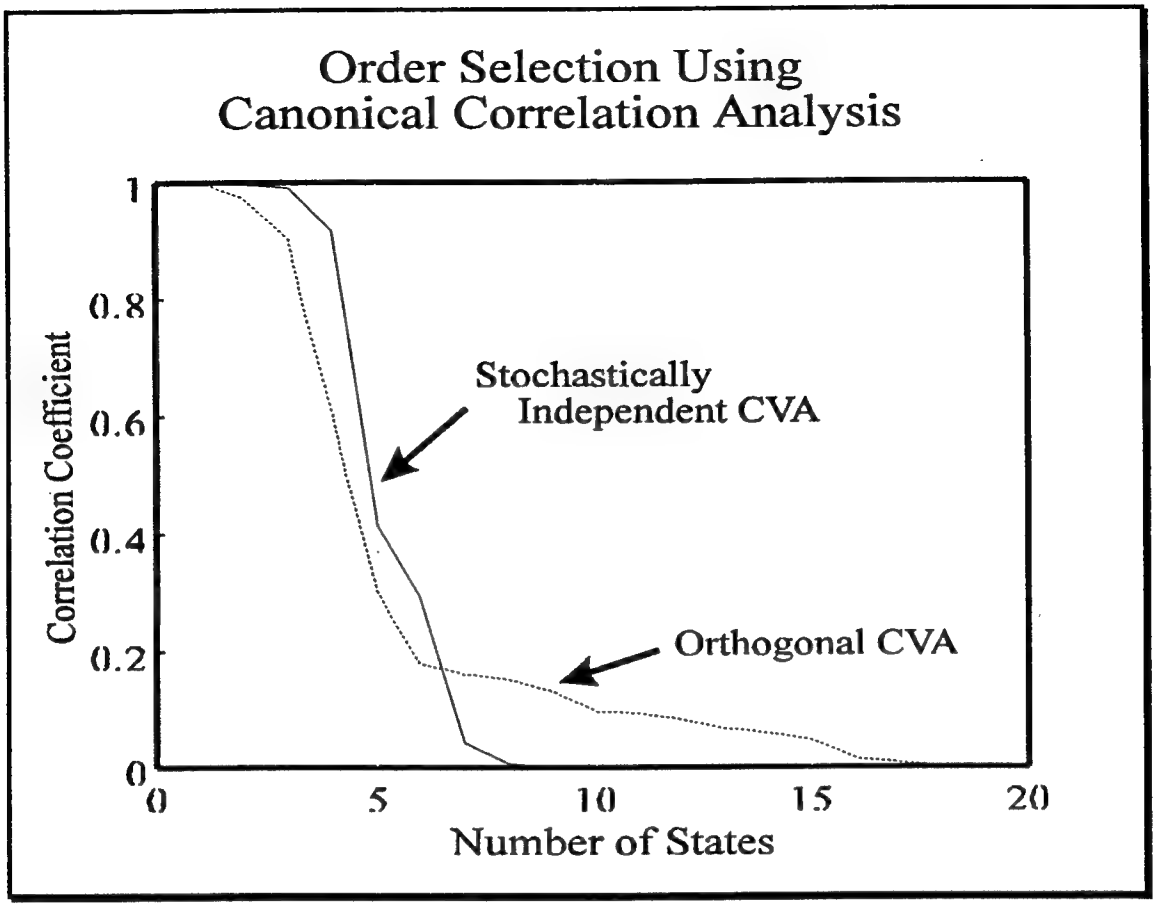

Figure 6.2.5. A Comparison of Results With Prior Results.

1.2.5 Stochastically Independent CVA Conclusions

There are 5 states in the Lorenz attractor, x_1, x_2, x_3, x_1x_2, and x_1x_3. Consequently, a order selection routine should identify 5 varaibles required (noise free case). Both the Table and the Figure show the improved discrimination of the Stochastically Independent CVA technique with less significance allocated to the lower valued variates.

1.3 REFERENCES

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APPENDIX A

This Appendix presents the 162 Combat Simulations selected from the *Catalog of Wargamming and Military Simulation Models, 11th Edition*, compiled by the Force Structure, Resource, and Assignment Directorate (J-8) [1].

Simulation :	Model Type :			
BONeS	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
BONeS	Training			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
BONeS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Sea	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
CEOPS	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Not Applicable	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Stochastic	Not Applicable		

Simulation :	Model Type :			
CEOPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
CEOPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
CEOPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
COM/EW	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Communications	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic, function of an expected value		One-sided	

Simulation :	Model Type :			
COM/EW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Electronic Warfare	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
COM/EW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		NS, Applicable	

Simulation :	Model Type :			
COMO ADC3	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Terrain	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
COMO ADC3	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Vegetation	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
COMO ADC3	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
DESCEM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Communications	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Not Applicable	

Simulation :	Model Type :			
DESCEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic		Not Applicable	

Simulation :	Model Type :			
DESCEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DESCEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
EIEM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Not Applicable	

Simulation :	Model Type :			
EIEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Digitized terrain	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
EIEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
EIEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
IMPACT	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Individual	Communications	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	Not Applicable		

Simulation :	Model Type :			
JCS3	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Barrier	Joint	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
JCS3	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Digitized terrain	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation : JCS3
Model Type : Not Applicable
Domain : Sea
Span : Not Applicable
Environment : Transportation factors
Force Composition : Not Applicable
Scope of Conflict : Elec. combat/warfare
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not Applicable
Time Processing : Not Applicable
Treatment of Randomness : Not Applicable
Sidedness : Reactive

Simulation : JCS3
Model Type : Not Applicable
Domain : Undersea
Span : Not Applicable
Environment : Urban
Force Composition : Not Applicable
Scope of Conflict : Nuclear
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not Applicable
Time Processing : Not Applicable
Treatment of Randomness : Not Applicable
Sidedness : Not Applicable

Simulation : JTIDSC2
Model Type : Analysis, operation support tool (decision aid)
Domain : Air
Span : Theater
Environment : Communications
Force Composition : Combined
Scope of Conflict : Conventional
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not permitted
Time Processing : Dynamic, event-step
Treatment of Randomness : Stochastic, direct computation
Sidedness : Not Applicable

Simulation : JTIDSC2
Model Type : Not Applicable
Domain : Land
Span : Not Applicable
Environment : Not Applicable
Force Composition : Joint
Scope of Conflict : Not Applicable
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not Applicable
Time Processing : Not Applicable
Treatment of Randomness : Stochastic, Monte Carlo
Sidedness : Not Applicable

Simulation :	Model Type :			
JTIDSC2	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
JTIDSC2	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
MSEPAM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Intratheater	Communications	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic		Not Applicable	

Simulation :	Model Type :			
MSEPAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Digitized terrain	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
NAM	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Cultural features	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
NAM	Training and education, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Terrain	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic	Not Applicable		

Simulation :	Model Type :			
NETSIM	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Not Applicable	Communications	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, direct computation	One-sided		

Simulation :	Model Type :			
NETSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for interactive decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
NETWORK II	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Not Applicable	Communications	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		One-sided	

Simulation :	Model Type :			
PACES	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Communications	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Not Applicable	

Simulation :	Model Type :			
PACES	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, direct computation		Not Applicable	

Simulation :	Model Type :			
PACES	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
PACES	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
PEJ	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Communications	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Not Applicable		

Simulation :	Model Type :			
PLRS/EPLRS	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Terrain	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
PLRS/EPLRS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Radar	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Not Applicable	Communications	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Stochastic, direct computation	One-sided		

Simulation :	Model Type :			
Radar	Training			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Radar	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Radar	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
RCN	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Communications	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
Space CEM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Space	Component	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Not Applicable		

Simulation :	Model Type :			
Space CEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Space CEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Space CEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TACSIM	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Battlefield	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
TACSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TACSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TMDC3ISIM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Digitized terrain	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required, model interruptable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic, function of expected value		Two-sided	

Simulation :	Model Type :			
TMDC3ISIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
TMDC3ISIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
WAAM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Not Applicable	Element	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		One-sided	

Simulation :	Model Type :			
WAAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
WAAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
WAAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
ALARM	Analysis, research and evaluation tool dealing with c Abat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, closed form	Deterministic		One-sided	

Simulation :	Model Type :			
ALARM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ALARMPP	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Air	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	Two-sided		

Simulation :	Model Type :			
ALARMPP	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
ALARMSS	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, closed form	Deterministic	Two-sided		

Simulation :	Model Type :			
ALARMSS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
ALARMSS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Sea	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
COM/EW	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Communications	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic, function of an expected value		One-sided	

Simulation :	Model Type :			
COM/EW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Electronic Warfare	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
COM/EW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicabit	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
CRUISE_MIS	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Local	Sea States	Not Applicable	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
CRUISE_MIS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
DAP	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Not Applicable	Electronic Warfare	Not Applicable	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
DEWCOM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Communications	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required, model interruptable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
DEWCOM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Electronic Warfare	Combined	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Asymmetric		

Simulation :	Model Type :			
DEWCOM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
ECECE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Electronic Warfare	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Two-sided		

Simulation :	Model Type :			
ECECE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
EMSA	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Not Applicable	Electronic Warfare	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
EMSA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
EWS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Electronic Warfare	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	Two-sided		

Simulation :	Model Type :			
EWS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Meteorological conditions	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic	Symmetric		

Simulation :	Model Type :			
EWS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
Frequency	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Communications	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Statistical	Deterministic	Not Applicable		

Simulation :	Model Type :			
Frequency	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, direct computation	Not Applicable		

Simulation :	Model Type :			
Frequency	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
Frequency	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
GEMMTLCM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Air	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, closed form	Deterministic		Two-sided	

Simulation :	Model Type :			
GEMMTLCM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
IMOM	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Electronic Warfare	Component	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Not Applicable	

Simulation :	Model Type :			
IMOM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
IMOM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
IPARS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, closed form	Deterministic		Two-sided	

Simulation :	Model Type :			
IPARS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
MIDAS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Regional	Digitized terrain	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Not Applicable	Two-sided		

Simulation :	Model Type :			
MIDAS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Electronic Warfare	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
NETS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Terrain	Conceptual	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
NETS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Element	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Not Applicable		Not Applicable	

Simulation :	Model Type :			
REVAM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Communications	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		One-sided	

Simulation :	Model Type :			
REVAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Electronic Warfare	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SCARE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic		Two-sided	

Simulation :	Model Type :			
SCARE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Asymmetric	

Simulation :	Model Type :			
SCARE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
SOJ	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Meteorological conditions	Not Applicable	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not A	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Two-sided	

Simulation :	Model Type :			
SOJ	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Typ :			
SPAM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Earth	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Two-sided	

Simulation :	Model Type :			
SPAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic		Asymmetric	

Simulation :	Model Type :			
SPAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
STAIR	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic	Deterministic		Two-sided	

Simulation :	Model Type :			
STAIR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
STAIR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
STEWS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Land	Not Applicable	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Two-sided	

Simulation :	Model Type :			
STEWS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Regional	Sea	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic		Asymmetric	

Simulation :	Model Type :			
STEWS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
STEWS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
TFMS	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Cultural features	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
TFMS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TFMS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weathe	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
G2WS	Training and education, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Communications	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, direct computation	One-sided		

Simulation :	Model Type :			
G2WS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Day and night	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
G2WS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Digitized terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
G2WS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
ICM	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Air	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
ICM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Land	Not Applicable	Unconventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
ICM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable			

Simulation :	Model Type :			
SPAN	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Communications	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Not Applicable		

Simulation :	Model Type :			
SPAN	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Electronic Warfare	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ACAAM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Cultural features	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
ACAAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Global	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
Agile	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
Agile	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
Agile	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ALB-XMOD	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Battlefield	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic, function of an expected value	Two-sided		

Simulation :	Model Type :			
ALB-XMOD	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Symmetric		

Simulation :	Model Type :			
ALB-XMOD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ALB-XMOD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Trafficability	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ALB-XMOD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Urban	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ASESS	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Air	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic, function of an expected value		Two-sided	

Simulation :	Model Type :			
ASESS	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Night	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
ASESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
ATTACK Mod	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic		One-sided	

Simulation :	Model Type :			
ATTACK Mod	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Seasons	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ATTACK Mod	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
AURA	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Weather	Element	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
AURA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Combined
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
AURA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
AURA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
Automated	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Geogra	Terrain	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo			

Simulation :	Model Type :			
Automated	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Vegetation	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
AWSIMS	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Cultural features	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic	Three-sided		

Simulation :	Model Type :			
AWSIMS	Training and education, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Day and night	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
AWSIMS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
BBS (COMBA	Training			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Digitized terrain	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic	Two-sided		

Simulation :	Model Type :			
BBS (COMBA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Forestation	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
BBS (COMBA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
BPS	Training and education, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Barrier	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Two-sided	

Simulation :	Model Type :			
BPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Cultural features	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, direct computation		Symmetric	

Simulation :	Model Type :			
BPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Digitized terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Not Applicable		

Simulation :	Model Type :			
BPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Vegetation	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
BPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Combat Mod	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Terrain	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	Two-sided		

Simulation :	Model Type :			
Combat Mod	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic	Symmetric		

Simulation :	Model Type :			
COMMANDER	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Barrier	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic	Two-sided		

Simulation :	Model Type :			
COMMANDER	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Day and night	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Symmetric		

Simulation :	Model Type :			
COMMANDER	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
COMMANDER	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ConMod	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Cultural features	Combined	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic	Two-sided		

Simulation :	Model Type :			
ConMod	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Sector	Day and night	Joint	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
ConMod	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Digitized terrain	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ConMod	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ConMod	Training and education, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Correlatio	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Not Applicable	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Two-sided		

Simulation :	Model Type :			
Correlatio	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Regional	Not Applicable	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Correlatio	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Theater	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DIVLEV	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Barrier	Combined	Chemical
Mission Area :	Level of Detail :	Construction :		
N	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Two-sided	

Simulation :	Model Type :			
DIVLEV	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Day and night	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
DIVLEV	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DIVLEV	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Urban	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DIVLEV	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Vegetation	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DIVLEV	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
Fast Stick	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
Fast Stick	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Asymmetric		

Simulation :	Model Type :			
FLAPS	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
FLAPS	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable			
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
FLAPS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
FOF	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Transportation factors	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required, model interruptable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
FOF	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Joint	Rear area
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
FOF	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
FORGE-FORC	Education			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required, model interruptable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
FORGE-FORC	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
FORGE-FORC	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Transportation factors	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
GRWSIM	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Combined	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
GRWSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Hex-based	Joint	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Symmetric		

Simulation :	Model Type :			
GRWSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
GRWSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
GRWSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Transportation factors	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
GRWSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Barrier	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
HELSCAM	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Digitized terrain	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
HELSCAM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
JAGUAR	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
JAGUAR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Not Applicable		

Simulation :	Model Type :			
JAWS (J-8	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic, function of expected value	Two-sided		

Simulation :	Model Type :			
JAWS (J-8	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Global	Land	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Symmetric		

Simulation :	Model Type :			
JAWS (J-8	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Sea	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JAWS (NDU	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Barrier	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
JAWS (NDU	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Day and night	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Asymmetric	

Simulation :	Model Type :			
JAWS (NDU	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
JAWS (NDU	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Hex-based	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
JAWS (NDU	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
JAWS (NDU	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Transportation factors	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JESS	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Barrier	Combined	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Two-sided		

Simulation :	Model Type :			
JESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Hex-based	Joint	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
JESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Time of day	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Transportation factors	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Urban	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Vegetation	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JESS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JTLS	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Barrier	Combined	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	Two-sided		

Simulation :	Model Type :			
JTLS	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Hex-based	Joint	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, direct computation	Asymmetric		

Simulation :	Model Type :			
JTLS	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Time of day	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Reactive		

Simulation :	Model Type :			
JTLS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Trafficability	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JTLS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
MACRO	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	Two-sided		

Simulation :	Model Type :			
MACRO	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
MACRO-2	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Not Applicable	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation : MACRO-2
Model Type : Not Applicable
Domain : Land
Span : Not Applicable
Environment : Not Applicable
Force Composition : Joint
Scope of Conflict : Not Applicable
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not Applicable
Time Processing : Not Applicable
Treatment of Randomness : Not Applicable
Sidedness : Asymmetric

Simulation : MACRO-2
Model Type : Not Applicable
Domain : Not Applicable
Span : Not Applicable
Environment : Not Applicable
Force Composition : Not Applicable
Scope of Conflict : Not Applicable
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not Applicable
Time Processing : Not Applicable
Treatment of Randomness : Not Applicable
Sidedness : Reactive

Simulation : QJM
Model Type : Analysis, operation support tool (decision aid)
Domain : Air
Span : Sector
Environment : Day and night
Force Composition : Combined
Scope of Conflict : Conventional
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Required
Time Processing : Dynamic, time-step
Treatment of Randomness : Deterministic
Sidedness : Two-sided

Simulation : QJM
Model Type : Training
Domain : Land
Span : Not Applicable
Environment : Seasons
Force Composition : Joint
Scope of Conflict : Not Applicable
Mission Area : Not Applicable
Level of Detail : Not Applicable
Construction : Not Applicable
Time Processing : Not Applicable
Treatment of Randomness : Not Applicable
Sidedness : Symmetric

Simulation :	Model Type :			
QJM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
QJM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SOTACA	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
User Specified	Global	Battlefield	Any Mix	Biological
Mission Area :	Level of Detail :	Construction :		
N	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
SOTACA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Individual	Not Applicable	Not Applicable	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
SOTACA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Local	Not Applicable	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SOTACA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Regional	Not Applicable	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SOTACA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Theater	Not Applicable	Not Applicable	Political
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SOTACA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Rear area
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SOTACA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Special
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Soviet Tro	Training and education, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Geographic area	Air	Joint	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
Soviet Tro	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPEED84	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
SPEED84	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
SPEED84	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
SPIRITS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Electronic Warfare	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Component	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Combo	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SWATEM	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Day and night	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
SWATEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
SWATEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TACWAR	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Air	Combined	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Two-sided	

Simulation :	Model Type :			
TACWAR	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Joint	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
TACWAR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
TAC WEAPON	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		One-sided	

Simulation :	Model Type :			
TAC WEAPON	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Earth	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
VECTOR-3	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Barrier	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic, function of an expected value		Two-sided	

Simulation :	Model Type :			
VECTOR-3	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Battlefield	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Not Applicable		Symmetric	

Simulation :	Model Type :			
VECTOR-3	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Transportation factors	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
VECTOR-3	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Trafficability	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
VECTOR-3	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
ADB (Aircr	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Not Applicable		

Simulation :	Model Type :			
ADB (Attri	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
ADB (Attri	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Asymmetric		

Simulation :	Model Type :			
ADB (Attri	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Nonreactive		

Simulation :	Model Type :			
ADTAM	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		One-sided	

Simulation :	Model Type :			
ADTAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
AIRRAD	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Weather	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Not Applicable	

Simulation :	Model Type :			
AIRRAD	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
ALEx	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Not Applicable		

Simulation :	Model Type :			
ATTACK Mod	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
ATTACK Mod	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Seasons	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ATTACK Mod	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
CCBM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Any
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, closed form	Stochastic, direct computation		One-sided	

Simulation :	Model Type :			
CCBM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Not Applicable	

Simulation :	Model Type :			
CCBM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Not Applicable		Not Applicable	

Simulation :	Model Type :			
Error Anal	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Local	Not Applicable	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Stochastic, direct computation		One-sided	

Simulation :	Model Type :			
Error Anal	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Element	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Fast Stick	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
Fast Stick	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Asymmetric		

Simulation :	Model Type :			
ITAM	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
LABS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic, function of an expected value		Two-sided	

Simulation :	Model Type :			
LABS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Electronic Warfare	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Asymmetric	

Simulation :	Model Type :			
LABS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
MARGI-TAC	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Intratheater	Air	Combined	Strategic
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic, function of an expected value		One-sided	

Simulation :	Model Type :			
MARGI-TAC	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Not Applicable		

Simulation :	Model Type :			
SPEED84	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
SPEED84	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
SPEED84	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
TAC SABER	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Battlefield	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
TAC SABER	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TAC SABER	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TAC SELECT	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Battlefield	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
TAC SELECT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TAC SELECT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TAC Thunde	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required, model interruptable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	Two-sided		

Simulation :	Model Type :			
TAC Thunde	Education			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic	Reactive		

Simulation :	Model Type :			
TAC Thunde	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Trafficability	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TAC Thunde	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TALCCM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Air	Element	Special
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
TALCCM	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TEM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, closed form	Deterministic		One-sided	

Simulation :	Model Type :			
TEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TFDTAM	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		One-sided	

Simulation :	Model Type :			
TFDTAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Visual Sea	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	One-sided		

Simulation :	Model Type :			
ARTOAR	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
ARTOAR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
ARTOAR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Nonreactive		

Simulation :	Model Type :			
BETA	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	Two-sided		

Simulation :	Model Type :			
BETA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Nonreactive		

Simulation :	Model Type :			
BETA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ADTAM	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		One-sided	

Simulation :	Model Type :			
ADTAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
AASPEM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, direct computation		Two-sided	

Simulation :	Model Type :			
AASPEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo		Asymmetric	

Simulation :	Model Type :			
AASPEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
ADTAM	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	One-sided		

Simulation :	Model Type :			
ADTAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Balboa	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
Balboa	Training and ducation, skills development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Not Applicable	Rear area
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	RED side nonreactive (same for BLUE side)		

Simulation :	Model Type :			
TAC Brawle	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
TAC Brawle	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Earth	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
TAC Brawle	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
Fast Stick	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
Fast Stick	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :			
Dynamic, time-step	Not Applicable	Asymmetric		

Simulation :	Model Type :			
RECCE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Combined	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Three-sided		

Simulation :	Model Type :			
RECCE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Local	Cultural features	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
RECCE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Regional	Digitized terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
MULTI-ASPI	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
MULTI-ASPI	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
MULTI-ASPI	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
ABATAK	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Airbase	Local	Time of day	Airbase	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required, model interruptable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	One-sided		

Simulation :	Model Type :			
ABATAK	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ABATAK	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
CBAM	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic, function of an expected value	Two-sided		

Simulation :	Model Type :			
CBAM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Airbase	Not Applicable	Land	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
CBAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
ORDAM	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	AB	AB	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
TSAR	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Airbase	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
TSAR	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Geography	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
TSAR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TSAR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Time of day	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TSARINA	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Geography	Element	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
TSARINA	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Meteorological conditions	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
ACE	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Air	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic		Two-sided	

Simulation :	Model Type :			
ACE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Theater	Geography	Joint	Strategic
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Asymmetric	

Simulation :	Model Type :			
ACE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
ASUMS	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, direct computation	Two-sided		

Simulation :	Model Type :			
ASUMS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
BEST WEAPO	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Day and night	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic, generates value as a function of an expected value	Not Applicable		

Simulation :	Model Type :			
BEST WEAPO	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Time of day	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
BEST WEAPO	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
BETA	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic	Deterministic		Two-sided	

Simulation :	Model Type :			
BETA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Nonreactive	

Simulation :	Model Type :			
BETA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
CISCIAD	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Digitized terrain	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
CISCIAD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Time of day	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
CISCIAD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Vegetation	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	RED side nonreactive (same for BLUE side)		

Simulation :	Model Type :			
CISCIAD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
COMO III	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Digitized terrain	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, direct computation	Two-sided		

Simulation :	Model Type :			
COMO III	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Electronic Warfare	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Asymmetric		

Simulation :	Model Type :			
COMO III	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
COMO(T)	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Electronic Warfare	Component	Chemical
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
COMO(T)	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Theater	Time of day	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Not Applicable		Symmetric	

Simulation :	Model Type :			
COMO(T)	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Terrain	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
COMO(T)	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
End-Game	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Air	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Two-sided	

Simulation :	Model Type :			
Engage	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
Engage	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
ESAMS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	One-sided		

Simulation :	Model Type :			
ESAMS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Not Applicable		

Simulation :	Model Type :			
Fast Stick	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
Fast Stick	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Asymmetric		

Simulation :	Model Type :			
GUNFIRE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, closed form	Deterministic	One-sided		

Simulation :	Model Type :			
GUNFIRE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
HOME	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Electronic Warfare	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	One-sided		

Simulation :	Model Type :			
HOME	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
IRPD	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, closed form	Deterministic	One-sided		

Simulation :	Model Type :			
IRPD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
MABS-EX	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
MABS-EX	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Regional	Earth	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
MABS-EX	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
MPRES	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Earth	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	One-sided		

Simulation :	Model Type :			
MPRES	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Regional	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
NADM	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Global	Earth	Any Mix	Strategic
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
NADM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One side nonreactive (same for reactive)		

Simulation :	Model Type :			
NADM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
NADM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
P001	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Inogvidual	Terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo		One-sided	

Simulation :	Model Type :			
P001	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
PASTE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Cultural features	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic, function of an expected value		One-sided	

Simulation :	Model Type :			
PASTE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Sea States	Not Applicable	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, direct computation	Not Applicable		

Simulation :	Model Type :			
PASTE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic, Monte Carlo	Not Applicable		

Simulation :	Model Type :			
PIVADS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
PIVADS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Earth	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
RADGUNS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air		Land	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	One-sided		

Simulation :	Model Type :			
RADGUNS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
RADGUNS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SAAMBO	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, closed form	Deterministic	One-sided		

Simulation :	Model Type :			
SAAMBO	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SPAM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Earth	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		Two-sided	

Simulation :	Model Type :			
SPAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic		Asymmetric	

Simulation :	Model Type :			
SPAM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
SPIRITS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Electronic Warfare	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Component	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Combo	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
SUPPRESSOR	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Any Mix	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Deterministic		User Specified	

Simulation :	Model Type :			
SUPPRESSOR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic		Not Applicable	

Simulation :	Model Type :			
SUPPRESSOR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TACEM	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Day and night	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
TACEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
TACEM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
TAC REPELL	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Day and night	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
TAC REPELL	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
TAC REPELL	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Reactive	

Simulation :	Model Type :			
TACWARS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Battlefield	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic	Deterministic		One-sided	

Simulation :	Model Type :			
TACWARS	Training and education			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Digitized terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Symmetric	

Simulation :	Model Type :			
TACWARS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Geography	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
TOTAL ROUN	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Air	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for setup		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
TOTAL ROUN	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Day and night	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TRICIA	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	One-sided		

Simulation :	Model Type :			
TRICIA	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Day and night	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
UVWR	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Weather	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
UVWR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
VEDER	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	One-sided		

Simulation :	Model Type :			
VEDER	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
GIFT	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Deterministic		Not Applicable	

Simulation :	Model Type :			
GIFT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic		Not Applicable	

Simulation :	Model Type :			
GIFT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
JANUS/R	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Digitized terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
JANUS/R	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Time of day	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
JANUS/R	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
JANUS/R	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Electronic Warfare	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Component	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Combo	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
VAST	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One-sided		

Simulation :	Model Type :			
GIFT	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Deterministic	Not Applicable		

Simulation :	Model Type :			
GIFT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Stochastic	Not Applicable		

Simulation :	Model Type :			
GIFT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
JANUS/R	Analysis, research and evaluation tool dealing with force capability and requirements			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Digitized terrain	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
JANUS/R	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Time of day	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
JANUS/R	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
JANUS/R	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
MATADOR	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, closed form	Stochastic		Two-sided	

Simulation :	Model Type :			
MATADOR	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Symmetric	

Simulation :	Model Type :			
SLAVE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Elec. combat/warfare
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		Two-sided	

Simulation :	Model Type :			
SLAVE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
SLAVE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Sea	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SLAVE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Space	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Analysis			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Electronic Warfare	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Component	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for analysis		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
SPIRITS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Combo	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processin` :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
STOCHADE	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Local	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Deterministic	Two-sided		

Simulation :	Model Type :			
STOCHADE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Regional	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic	Symmetric		

Simulation :	Model Type :			
TANK WARS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Battlefield	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
TANK WARS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Asymmetric		

Simulation :	Model Type :			
TANK WARS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
VAST	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Abstract	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	One-sided		

Simulation :	Model Type :			
WEIGHT	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for input		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	Not Applicable		

Simulation :	Model Type :			
WEIGHT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
CISCIAD	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Digitized terrain	Not Applicable	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, event-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
CISCIAD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Time of day	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
CISCIAD	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Vegetation	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		RED side nonreactive (same for BLUE side)	

Simulation :	Model Type :			
CISCIAD	Not Appl`cable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
ALWSIM III	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Sector	Land	Component	Laser
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
ALWSIM III	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Not Applicable	Not Applicable		

Simulation :	Model Type :			
BLUEMAX II	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Terrain	Element	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, closed form	Deterministic	One-sided		

Simulation :	Model Type :			
CFARC	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Global	Electronic Warfare	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Stochastic, Monte Carlo	One-sided		

Simulation :	Model Type :			
CFARC	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
CFARC	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DETCONT	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Regional	Day and night	Element	Detection
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Deterministic		One-sided	

Simulation :	Model Type :			
DETCONT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
DETCONT	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
Eagle	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Terrain	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required for decisions and processes		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, time-step	Deterministic	Two-sided		

Simulation :	Model Type :			
Eagle	Training and education, exercise driver			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Not Applicable	Joint	Nuclear
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Symmetric		

Simulation :	Model Type :			
Eagle	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
EDECSIM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Cultural features	Conceptual	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Two-sided		

Simulation :	Model Type :			
EDECSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Meteorological conditions	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
EDECSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
EDECSIM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Vegetation	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
EOVAC	Analysis, research and evaluation tool			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Battlefield	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Required		
Time Processing :	Treatment of Randomness :		Sidedness :	
Static	Stochastic, direct computation		Two-sided	

Simulation :	Model Type :			
EOVAC	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Day and night	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Stochastic, Monte Carlo		Reactive	

Simulation :	Model Type :			
GEMM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Local	Air	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Stochastic, Monte Carlo		Two-sided	

Simulation :	Model Type :			
GEMM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Land	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Asymmetric	

Simulation :	Model Type :			
GEMM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Sea	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Reactive		

Simulation :	Model Type :			
IEW	Analysis, operation support tool (decision aid)			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Theater	Land	Combined	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, closed form	Deterministic	Not Applicable		

Simulation :	Model Type :			
IEW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Time of day	Joint	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic, event-step	Stochastic, Monte Carlo	Not Applicable		

Simulation :	Model Type :			
IEW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Naval	Not Applicable	Terrain	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
IEW	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Space	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
OBSERVE	Analysis, research and evaluation tool dealing with combat development			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Regional	Day and night	Element	Detection
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not permitted		
Time Processing :	Treatment of Randomness :		Sidedness :	
Dynamic, time-step	Deterministic		One-sided	

Simulation :	Model Type :			
OBSERVE	Training and education, skills developm			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Terrain	Not Applicable	Laser
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
OBSERVE	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Not Applicable	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

Simulation :	Model Type :			
TAC RANGER	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Not Applicable	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	One-sided		

Simulation :	Model Type :			
TAPM	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Regional	Terrain	Component	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Dynamic	Deterministic	Not Applicable		

Simulation :	Model Type :			
TAPM	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Not Applicable	Weather	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :	Sidedness :		
Not Applicable	Not Applicable	Not Applicable		

Simulation :	Model Type :			
TIS	Analysis, research and evaluation tool dealing with weapon systems			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Air	Individual	Weather	Element	Conventional
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not required		
Time Processing :	Treatment of Randomness :	Sidedness :		
Static	Deterministic	One-sided		

Simulation :	Model Type :			
TIS	Not Applicable			
Domain :	Span :	Environment :	Force Composition :	Scope of Conflict :
Land	Local	Not Applicable	Not Applicable	Not Applicable
Mission Area :	Level of Detail :	Construction :		
Not Applicable	Not Applicable	Not Applicable		
Time Processing :	Treatment of Randomness :		Sidedness :	
Not Applicable	Not Applicable		Not Applicable	

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MISSION

OF

ROME LABORATORY

Mission. The mission of Rome Laboratory is to advance the science and technologies of command, control, communications and intelligence and to transition them into systems to meet customer needs. To achieve this, Rome Lab:

a. Conducts vigorous research, development and test programs in all applicable technologies;

b. Transitions technology to current and future systems to improve operational capability, readiness, and supportability;

c. Provides a full range of technical support to Air Force Materiel Command product centers and other Air Force organizations;

d. Promotes transfer of technology to the private sector;

e. Maintains leading edge technological expertise in the areas of surveillance, communications, command and control, intelligence, reliability science, electro-magnetic technology, photonics, signal processing, and computational science.

The thrust areas of technical competence include: Surveillance, Communications, Command and Control, Intelligence, Signal Processing, Computer Science and Technology, Electromagnetic Technology, Photonics and Reliability Sciences.